



Installation of New Heating, Ventilation, and Air Conditioning System Environmental Assessment October 2003



Environmental Assessment

Installation of New Heating, Ventilation, and Air Conditioning System

MESA VERDE National Park • Colorado

The National Park Service (NPS) proposes to install a new heating, ventilation, and air conditioning (HVAC) system for the purpose of preserving cultural resources and providing a safe and pleasant environment for visitors and employees in the headquarters area of Mesa Verde National Park. A new HVAC system would provide air conditioning to the Chapin Mesa Museum/Bookstore, which currently lacks any type of cooling device, and would provide more efficient heating and cooling in the park headquarters and Chief Ranger's office. Use of heating fuels stored underground would continue to threaten the environment. This environmental assessment analyzes two alternatives to cope with the currently inadequate heating and cooling system, a no action alternative and one action alternative.

Alternative A - No Action Alternative: The heating and cooling system that currently exists would not be replaced or considerably rehabilitated in any manner. No air conditioning system would be added to provide cooling in the museum, and existing monitoring and maintenance procedures would continue into the future.

Alternative B - Preferred Alternative: Install a new HVAC system that would consist of a central utility building, two 1000-gallon propane tanks, and utility lines to deliver water and propylene glycol heating/cooling solution to the museum, headquarters, and Chief Ranger's office.

This environmental assessment evaluated the effects of these alternatives on endangered, threatened, or protected species and critical habitats; natural soundscape; soils; vegetation; wildlife and habitats; archeological sites, historic districts, structures and cultural landscapes, and collections and Native American concerns; park operations; public health and safety; and visitor use and experience. None of the alternatives would have major effects on any of these impact topics or would impair resources and values that are considered necessary and appropriate to fulfill the purposes of Mesa Verde National Park. Among other benefits, the installation of a new HVAC system would help ensure a quality visitor experience and the protection of the park's natural and cultural resources, most significantly, the Native American artifact collection inside the museum.

Public Comment

If you wish to comment on the environmental assessment, you may mail comments to the name and address below. This document will be on public review for 30 days. Please note that names and addresses of people who comment become part of the public record. **If you wish us to withhold your name and/or address, you must state this prominently at the beginning of your comment.** We will make all submissions from organizations, from businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses available for public inspection in their entirety.

COMMENTS MUST BE RECEIVED BY NOVEMBER 7, 2003. Please address written comments to:

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United States Department of the Interior • National Park Service • Mesa Verde National Park

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PURPOSE AND NEED

The purpose of this project is to provide a safer and more pleasant environment for both visitors and employees, and to improve resource protection by improving the cooling and heating system associated with the Chapin Mesa Museum/Bookstore (hereafter "museum"), park headquarters, and Chief Ranger's office. This action is intended to improve the quality of the visitor experience, staff working conditions, and better preserve the park's cultural resource collection.

The existing heating and cooling system is presently insufficient and leads to the creation of uncomfortable and potentially unsafe conditions in and around the most highly visited area in Mesa Verde National Park. The museum is not air conditioned. There is no modern air conditioning system in the park headquarters building or the Chief Ranger's office, and the present air conditioning units are ineffective. As a result, temperatures in these buildings in the summer can range from 75 to 90 degrees, causing degradation to the artifacts on display in the museum and making it extremely uncomfortable for visitors. Associated fluctuations in humidity also contribute to deterioration of artifacts and exhibits.

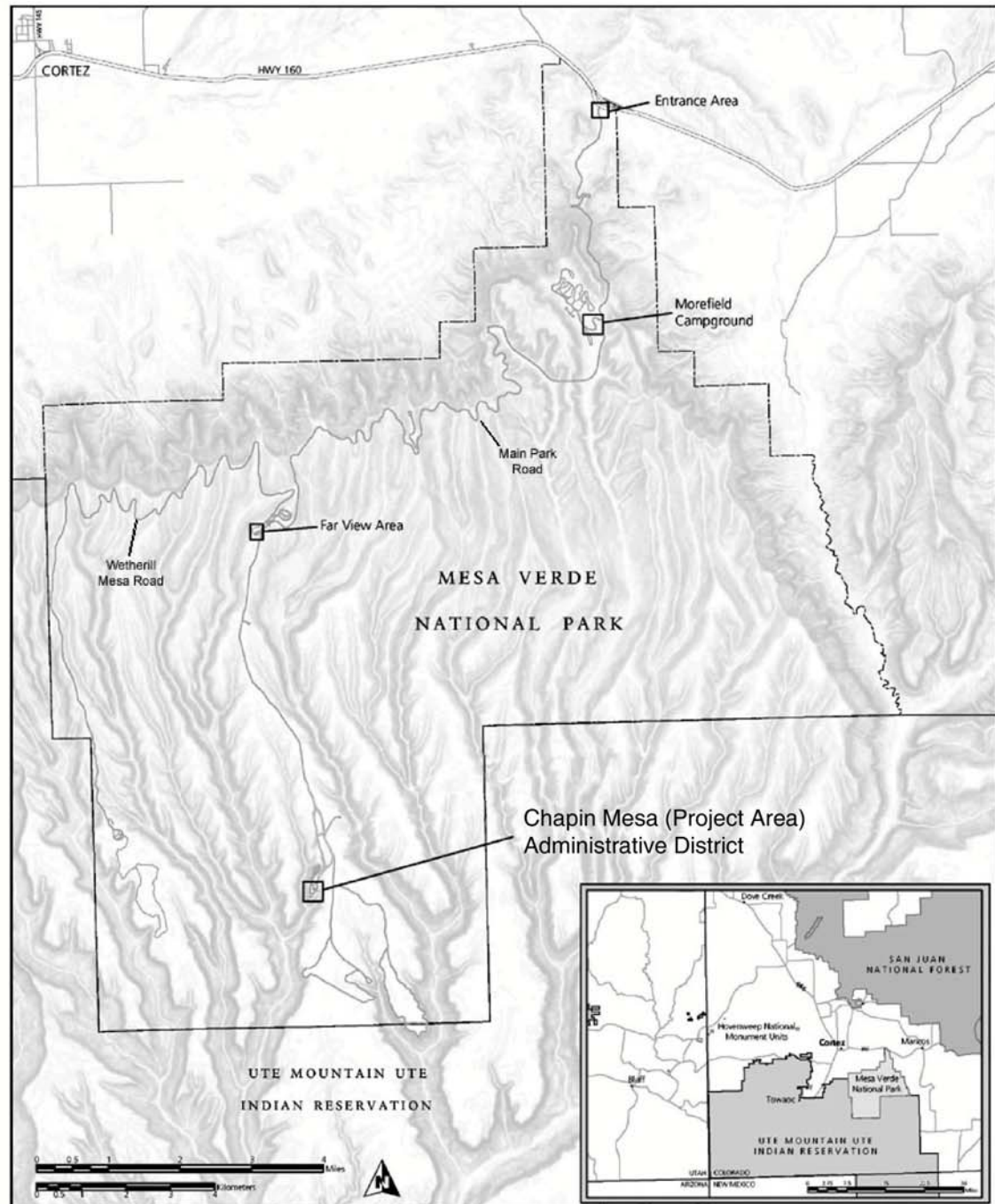
Additionally, the heating systems for these buildings are comprised of oil-fired boilers with underground fuel storage tanks that need to be replaced. The boilers have been in use for more than thirty years and require frequent repair and maintenance in order to reduce the potential for fire in these historic structures. The underground storage tanks also require frequent filling and special monitoring during this process to prevent an overflow of fuel. The park desires to use a fuel that burns cleaner than heating oil.

PARK DESCRIPTION

Mesa Verde National Park, encompassing about 52,000 acres, is located in the high plateau country of southwestern Colorado. The park entrance is midway between Cortez and Mancos, south off U.S. Highway 160. Morefield campground and Far View Visitor Center are located 4 miles and 15 miles, respectively, from the park entrance. Park headquarters, the museum, and the Chief Ranger's office are located on Chapin Mesa in the administrative district. The Mesa Verde National Park Regional Location and Vicinity Map shows the locations of these features.

Mesa Verde National Park Regional Location and Project Vicinity Map

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PURPOSE AND NEED

Mesa Verde, Spanish for "green table," offers an unparalleled opportunity to see and experience a unique cultural and physical landscape. The culture represented at Mesa Verde reflects more than 700 years of history. From approximately 600 A.D. through 1300 A.D., people lived and flourished in communities throughout the area, eventually building elaborate stone villages in the sheltered alcoves of the canyon walls. Today most people call these sheltered villages "cliff dwellings." The cliff dwellings represent the last 100 to 125 years of occupation at Mesa Verde. In the late 1200's, within the span of one or two generations, these people left their homes and moved away.

The archeological sites found in Mesa Verde are some of the most notable and best preserved in the United States and the world. As a result, the area was designated a national park in 1906 and a World Heritage Site in 1978. Mesa Verde National Park offers visitors a spectacular look into the lives of the ancestral Pueblo people. Scientists study the ancient dwellings of Mesa Verde, in part, by making comparisons between the ancestral Pueblo people and their contemporary indigenous descendants who still live in the southwest today. Twenty-four Native American tribes in the southwest have an ancestral affiliation with the sites at Mesa Verde. A list of these tribes is provided in the "Consultation and Coordination" section.

PUBLIC SCOPING

Public scoping is an early and open process to solicit public and internal concerns relating to a proposed action. Although public scoping is not required for an environmental assessment, the National Park Service conducted scoping on this project to ensure input was obtained from all interested stakeholders.

The scoping process was used both to help define the issues and concerns associated with the proposed action and to develop the range of alternatives. Scoping involved the general public; the 24 American Indian tribes and pueblos associated with the park; Mesa Verde employees; and other federal, state, and local government agencies. The U.S. Fish and Wildlife Service and the State Historic Preservation Officer also were contacted.

A park newsletter with information on the project was mailed during January 2002 with follow up public meetings in the towns of Mancos and Cortez. Approximately 100 participants attended the two public meetings. Additional scoping was undertaken with the tribes at consultation meetings in 2001 and 2002 at Mesa Verde National Park and Acoma Pueblo in New Mexico. Approximately 40 tribal members attended both sessions. No major concerns were raised related to issues associated with the project. A summary of scoping activities is included in the "Consultation and Coordination" section.

DESCRIPTION OF THE PROJECT AREA

The project area is within the developed area on the southern end of Chapin Mesa. The developed area is bisected by the main park access road. The museum, trailhead to Spruce Tree Pueblo, Chief Ranger's office, park headquarters, and post office are located on the east side of the park access road. The library and public restrooms are located on the west side of the access road.

Hot water heat is currently provided to the museum, park headquarters, and Chief Ranger's office from boilers whose fuel supply is stored in four 500-gallon underground tanks. Two underground tanks are located next to the museum, one next to the headquarters building, and one next to the Chief Ranger's office. The boilers, which are located in the basements of each of the buildings, have been in use for more than 30 years and require frequent maintenance to reduce the potential for fire in these historic structures. The underground fuel storage tanks also require frequent filling and special monitoring during this process to prevent an overflow of fuel.

Park headquarters and the Chief Ranger's office each have one air-cooling unit to service the building. These are located on the roof or in front of the building, which diminishes the historic feel of the structures, and each unit needs continual maintenance in order to keep it working efficiently. However, the air conditioning would continue to be insufficient in cooling the buildings to comfortable temperatures on extremely hot days because of the size of the buildings. The museum does not have any system in place to adequately cool the building. The fluctuating temperatures and humidity continue to contribute to deterioration of the museum collections and exhibits. Temperatures exceeding 90 degrees in the summer make it an uncomfortable and potentially unsafe environment for visitors and staff.

ISSUES, CONCERNS, AND DERIVATION OF IMPACT TOPICS

Issues and concerns related to the installation of a HVAC system include:

- Effects on the visitor experience and public health and safety with development of a new HVAC system,
- Effects on natural resources, including plants, wildlife, and soils, from construction activity,
- Potential disturbance of prehistoric and historic archeological resources during construction of a new HVAC structure and utility lines, and

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- Impacts on the National Historic Landmark District structures and landscape from construction activities, including the addition of a new building in a landmark district.

IMPACT TOPICS

The candidate impact topics considered for the Mesa Verde National Park evaluation of the installation of the HVAC system are presented in Table 1. The table includes key regulations or policies for each impact topic. Based on site-specific conditions, several of the candidate impact topics were dismissed from further consideration. The rationale for dismissing each of these impact topics is provided in the text following the table.

Rationales for Dismissing Impact Topics

Air quality: Air quality would not be affected by development and operation of the HVAC system. Temporary adverse effects during construction would be offset by the use of best management practices.

Ecologically critical areas: Mesa Verde National Park does not contain any designated ecologically critical areas, wild and scenic rivers, or other unique natural resources, as referenced in 40 *Code of Federal Regulations* 1508.27.

Energy requirements and conservation potential: Refer to the impact topic “Sustainability and long-term management” for a rationale for dismissal.

Prime and unique farmland: Prime farmland has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oil-seed crops. Unique land is land other than prime farmland that is used for production of specific high-value food and fiber crops. Both categories require that the land is available for farming uses. Lands within Mesa Verde National Park are not available for farming and, therefore, do not meet the definitions.

Water quality and hydrology: During construction activity, there would be minimal amounts of vegetation removed and disturbance to soils. Revegetating the area would reduce any potential for sediment transport. These management practices would ensure that construction-related adverse effects would not affect water quality and hydrology.

Wetland and floodplains: The headquarters area within Mesa Verde National Park does not contain any designated wetlands or floodplains.

**TABLE 1: IMPACT TOPICS RETAINED OR DISMISSED
FROM FURTHER CONSIDERATION**

Impact Topic	Retain or Dismiss	Relevant Law, Regulation or Policy
Biological and physical resources		
Air quality	Dismiss	Federal Clean Air Act , Clean Air Act Amendments of 1990, <i>Management Policies 2001</i>
Ecologically critical areas or other unique natural resources	Dismiss	Wild and Scenic Rivers Act, 36 <i>Code of Federal Regulations</i> 62 criteria for national natural landmarks, <i>Management Policies 2001</i>
Endangered, threatened, or protected species and critical habitats	Retain	Endangered Species Act; <i>Management Policies 2001</i>
Energy requirements and conservation potential	Dismiss	<i>Management Policies 2001</i>
Prime and unique farmland	Dismiss	Council on Environmental Quality 1980 memorandum on prime and unique farmlands
Soils	Retain	<i>Management Policies 2001</i>
Natural Soundscape	Retain	Director's Order 47, <i>Management Policies 2001</i>
Vegetation	Retain	<i>Management Policies 2001</i>
Water quality and hydrology	Dismiss	Clean Water Act, Executive Order 12088, <i>Management Policies 2001</i>
Wetlands and floodplains	Dismiss	Executive Order 11988, Executive Order 11990, Rivers and Harbors Act, Clean Water Act, <i>Management Policies 2001</i>
Wildlife and habitats	Retain	<i>Management Policies 2001</i>
Cultural resources	Retain	National Historic Preservation Act, Archeological and Historic Preservation Act, Archeological Resources Protection Act, National Environmental Policy Act, 36 <i>Code of Federal Regulations</i> 800, Executive Order 11593, Executive Order 13007, Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation, Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes, Director's Order 28, <i>Management Policies 2001</i>

**TABLE 1: IMPACT TOPICS RETAINED OR DISMISSED
FROM FURTHER CONSIDERATION**

Impact Topic	Retain or Dismiss	Relevant Law, Regulation or Policy
Socioeconomic considerations		
Conflicts with land use plans, policies, or controls	Dismiss	<i>Management Policies 2001</i>
Economics	Dismiss	40 <i>Code of Federal Regulations</i> 1500 Regulations for Implementing the National Environmental Policy Act
Environmental justice	Dismiss	Executive Order 12898
Indian trust resources	Dismiss	Department of the Interior Secretarial Order No. 3206, Secretarial Order No. 3175
Natural or depletable resource requirements and conservation potential	Dismiss	<i>Management Policies 2001</i>
Park operations	Retain	<i>Management Policies 2001</i>
Public health and safety	Retain	<i>Management Policies 2001</i>
Sustainability and long-term management	Dismiss	National Environmental Policy Act, 40 <i>Code of Federal Regulations</i> 1500 Regulations for Implementing the National Environmental Policy Act, <i>Management Policies 2001</i>
Visitor use and experience	Retain	Organic Act, <i>Management Policies 2001</i>

Conflicts with land use plans, policies, or controls: Refer to the section “Relationship of this Project to Other Plans” for a discussion of the absence of conflicts with other plans.

Economics: Because of the small scale of installing a central HVAC system at the headquarters area of the park, there are not expected to be any adverse or beneficial effects to the economy of the counties adjacent to the park or in the region.

Environmental justice: Executive Order 12898, “General Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,” requires that all federal agencies address the effects of policies on minorities and low-income populations and communities. None of the alternatives would have disproportionate health or environmental effects on minorities or low-income populations as defined in the Environmental Protection Agency’s Final Environmental Justice Guidance (July 1996).

Indian trust resources: Indian trust assets are owned by Native Americans but held in trust by the United States. Requirements are included in the Secretary of the Interior's Secretarial Order No. 3206, "American Indian Tribal Rites, Federal – Tribal Trust Responsibilities, and the Endangered Species Act," and Secretarial Order No. 3175, "Departmental Responsibilities for Indian Trust Resources." According to National Park Service personnel, Mesa Verde National Park does not have any Indian trust assets within the park.

Natural or depletable resource requirements and conservation potential: Refer to the impact topic "Sustainability and long-term management" for the rationale for dismissal.

Sustainability and long-term management: Sustainability is the result achieved by doing things in ways that do not compromise the environment or its capacity to provide for present and future generations. Sustainable practices minimize the short- and long-term environmental impacts of development and other activities through resource conservation, recycling, waste minimization, and the use of energy-efficient and ecologically responsible materials and techniques.

The NPS Guiding Principles of Sustainable Design (1993) directs NPS management philosophy. It provides a basis for achieving sustainability in facility planning and design, emphasizes the importance of biodiversity, and encourages responsible decisions. The guidebook articulates principles to be used in the design and management of visitor facilities that emphasize environmental sensitivity in construction, use of nontoxic materials, resource conservation, recycling, and integration of visitors with natural and cultural settings. Sustainability principles have been developed and are followed for interpretation, natural resources, cultural resources, site design, building design, energy management, water supply, waste prevention, and facility maintenance and operations. The National Park Service also reduces energy costs, eliminates waste, and conserves energy resources by using energy-efficient and cost-effective technology. Energy efficiency is incorporated into the decision-making process during the design and acquisition of buildings, facilities, and transportation systems that emphasize the use of renewable energy sources.

RELATIONSHIP OF THIS PROJECT TO OTHER PLANS

While the park is in the midst of preparing several plans, only the fire management plan/environmental impact statement relates to this plan for providing a new HVAC system. The proposed action to replace an antiquated heating system to reduce the potential for fire in the headquarters area and to ensure the health

PURPOSE AND NEED

and safety of visitors and staff would be consistent with the objectives of a new fire management plan.

DESCRIPTION OF THE ALTERNATIVES

ALTERNATIVE A - NO ACTION ALTERNATIVE

Alternative A is the baseline condition against which proposed activities are compared. It is defined as taking no action in changing or altering current conditions. The heating and air conditioning systems currently found in the project area would not be replaced or considerably rehabilitated in any manner.

Hot water heat is currently provided to the museum, park headquarters, and Chief Ranger's office from boilers whose fuel supply is stored in four 500-gallon underground storage tanks. Two underground fuel tanks are located next to the museum, one next to the headquarters building, and one next to the Chief Ranger's office. The boilers, which are located in the basements of the buildings, have been in use for more than 30 years and require frequent repair and maintenance to reduce the potential for fire in these historic structures. The underground fuel storage tanks also require frequent filling and special monitoring during this process to prevent an overflow of fuel. Under Alternative A, these monitoring and maintenance procedures would continue into the future. Heat is supplied to the rooms in the buildings through a forced air system or hydronic heating systems.

The air conditioning in each of the three buildings would also remain the same under the No Action Alternative. Park headquarters and the Chief Ranger's office each have one air-cooling unit to service the building. The appearance of these units diminishes the historic feel of the structures, and each unit needs continued maintenance in order to keep it working efficiently. However, the air conditioning would continue to be insufficient in cooling the buildings to comfortable temperatures on extremely hot days because of the size of the buildings. The museum does not have any system in place to cool the area. The fluctuating temperatures and humidity continue to contribute to deterioration of collections and exhibits. Temperatures exceeding 90 degrees in the summer make it an uncomfortable and potentially unsafe environment for visitors and staff. Park staff would continue to monitor temperature and humidity in the museum building to help provide appropriate conditions for curation of artifacts and displays.

ALTERNATIVE B - PREFERRED ALTERNATIVE

Alternative B has been identified as the preferred alternative because it meets the objectives associated with the purpose and need for the proposed action.

Under the preferred alternative, a new HVAC system would be installed that would provide heating and air conditioning to the museum, park headquarters,

PURPOSE AND NEED

and Chief Ranger's office. This system is necessary to protect the priceless Native American artifact collections on public display in the museum and to provide comfortable climate control inside the buildings for both visitors and employees. The figure on page 14 illustrates Alternative B.

The buildings in the headquarters area are historic structures that are part of the Mesa Verde Administrative District, which is a National Historic Landmark. No surface-mounted heating and cooling equipment would be used, thus retaining the visual and structural integrity of these historic buildings. Instead, a central utility building, approximately 550 square feet in size, would be constructed to house the HVAC system. The new building would be constructed behind and to the southwest of the library along with a cooling tower. Two 1,000-gallon above-ground propane storage tanks would be placed in the present location of the propane tanks on the southeast corner of the library. The building would house two hot water boilers, a chiller unit, pumps, and associated equipment to provide heating and cooling. The propane tanks would be located approximately 500 feet north of the central HVAC utility building. The tanks would be placed on a 20 square foot cement pad and would be elevated off the ground on concrete cradles. The fuel lines from the propane tanks to the HVAC building would be installed in existing trenches currently used for fiber optic cable. The area of new ground disturbance from placement of the central HVAC building and the cement pad for the propane tanks would be approximately 570 square feet.

Although the HVAC building would be clearly distinguishable as new construction, it would not be in the main viewshed of visitors. Its simple low-profile design, using wood window frames and a stone façade, would help ensure that the structure does not adversely affect the surrounding landmark district and the cultural landscape. Vegetative screening and wood fences around the two propane tanks also would be used to prevent visual intrusions on the historic scene.

Piping from the central HVAC utility building would be installed underneath the existing asphalt walkways to deliver the water and propylene glycol heating/cooling solution to the museum, headquarters office, and Chief Ranger's office. These sidewalks would be replaced in kind after installation of the piping.

The system piping would be stubbed into each building and piped to serve the heating and cooling systems of each building. Installation of the heating and cooling lines to individual rooms within buildings would be done using existing ductwork. Existing heating units within rooms would be removed and replaced with new air-handling units. In rooms without existing heating units, one wall air-handling unit would be installed. New doors would be installed at the entrance to the museum, and the doors' scale, design, and materials would be carefully chosen to blend with the existing historic façade.

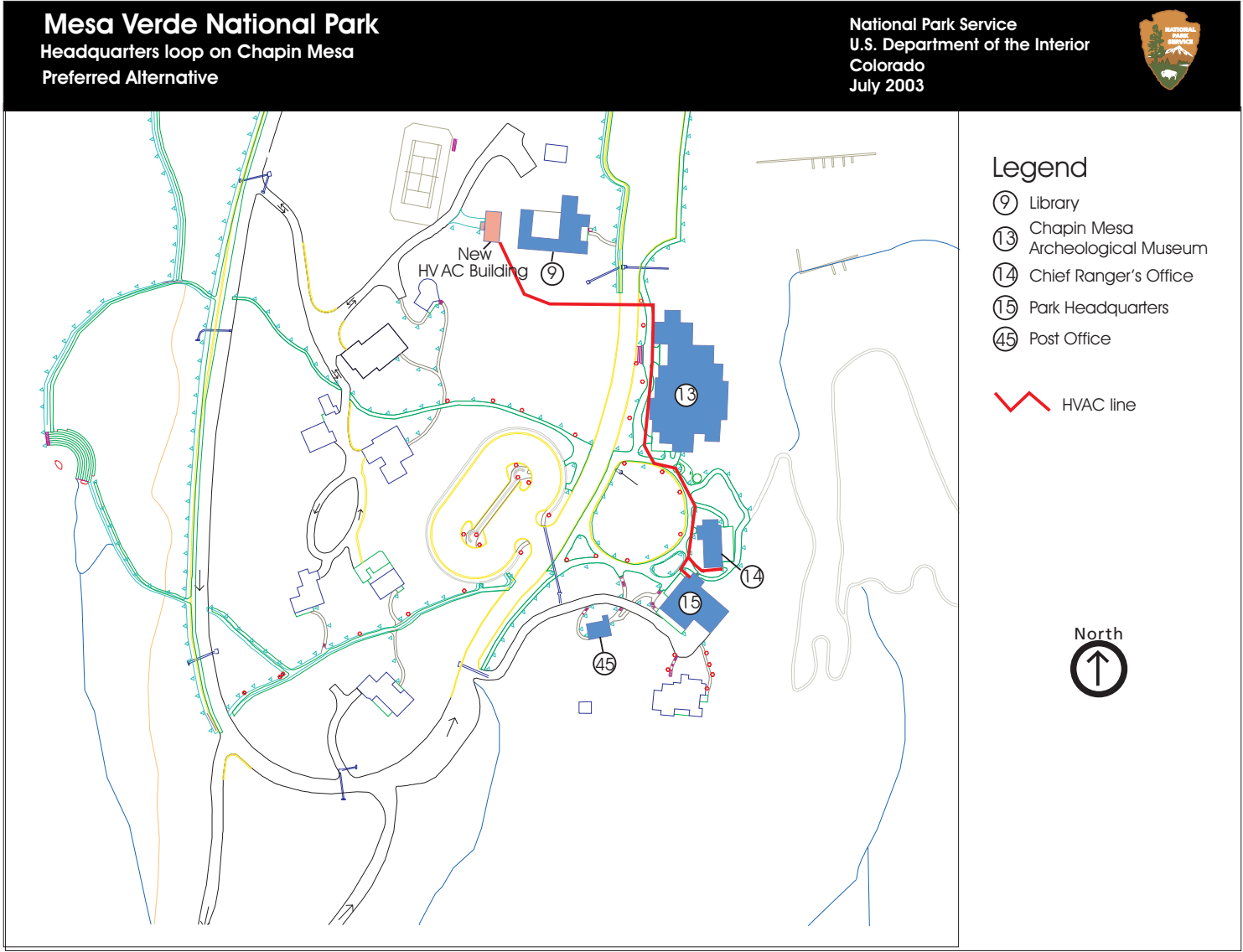
Construction of the new HVAC system is expected to last between 6 and 12 months. To avoid impacts to visitor use of the area, activities to lay the utility lines to service the three buildings would begin in November and end before the high visitor use period begins in May. Construction activity would be restricted to daylight hours.

ALTERNATIVES ELIMINATED FROM FURTHER CONSIDERATION

Four different alternatives were considered to address the HVAC needs in the headquarters area of the park. Two alternatives only considered improving the building's heating systems. One alternative would replace the existing underground boiler system in kind. The other alternative would replace the existing underground boiler system with new equipment using liquefied petroleum gas (LPG). These alternatives were dismissed from further consideration because they did not allow necessary improvements to the existing air conditioning system.

Two other alternatives were considered; one that involved a different type of HVAC system than the preferred alternative, and another that differed in the location of the central heating and cooling building. One alternative considered removal of the fuel storage tanks and existing HVAC equipment and installing rooftop electric/propane air conditioning units on the three buildings, with propane and electrical systems serving the buildings. This alternative was rejected from further consideration due to the magnitude of the visual impacts as well as the difficulty in incorporating the necessary ductwork in the limited space available. The second alternative was similar to the preferred alternative evaluated in this environmental assessment, with the exception that the location of the central HVAC utility building and associated propane tanks would be adjacent to the Post Office. This alternative was deemed less desirable than the preferred alternative because the chosen location placed the building and tanks in a highly visible public area and historic district.

PURPOSE AND NEED



MITIGATION MEASURES

Best management practices and mitigation measures would be used to prevent or minimize potential adverse effects associated with the proposed action alternative. These practices and measures would be incorporated into the project construction documents and plans. Mitigation measures undertaken during project implementation would include, but not strictly be limited to, those listed in Table 2.

TABLE 2: MITIGATION MEASURES AND BEST MANAGEMENT PRACTICES

Potential Adverse Effect	Mitigation Measure or Best Management Practice
Effects on cultural resources	<p>The proposed utility corridors and location for the central HVAC utility building have been surveyed for the presence of archeological resources (Smith 1987; Ives et al. 1999). Areas containing sensitive cultural resources would be identified in the construction operations plan. Work limits would be established and clearly marked to protect resources, and all protection measures would be clearly stated in the construction specifications. Workers would be instructed to avoid conducting activities beyond the construction zone and their compliance would be monitored by the project Contracting Officer's Technical Representative (COTR).</p> <p>During construction, an archeologist meeting the Secretary of the Interior's Standards would be assigned to the site during all earth-moving activities to monitor for previously undetected subsurface resources. This person would have the authority to stop work until the significance of a discovery was evaluated and appropriate documentation and recovery occurred. If a site was found, discovered resources would be evaluated for their significance, and a mitigation plan would be developed in consultation with the State Historic Preservation Officer. Mitigation probably would include relocating construction activities to avoid archeological sites.</p> <p>Any artifacts recovered during construction would be preserved and curated according to NPS and State Historic Preservation Officer requirements.</p>

TABLE 2: MITIGATION MEASURES AND BEST MANAGEMENT PRACTICES

Potential Adverse Effect	Mitigation Measure or Best Management Practice
	<p>To reduce unauthorized collecting, construction personnel would be educated about cultural resources in general and the need to protect and report any cultural resources encountered. Work crews would be instructed regarding the illegality of collecting artifacts on federal lands to avoid any potential Archeological Resources Protection Act violations.</p> <p>If buried human remains were encountered during construction, the monitoring archeologist would immediately halt construction in that immediate area. The archeologist would determine if the remains appeared to be older than 100 years. If they were, the park would follow the regulations for inadvertent discoveries under the Native American Graves Protection and Repatriation Act. These regulations require that the park consult with its 24 culturally affiliated tribes. The preferred treatment would be to leave the remains undisturbed and redesign the project to avoid the site. If avoidance was not possible, the remains would be removed by an archeologist and reburied in a nearby location through consultation with the tribes. This reburial would be completed within 30 days of discovery.</p> <p>The central HVAC utility building would be low profile and screened by the additional planting of trees and shrubs designed to blend with the surrounding landmark district. Building materials (stone façade) and design would be carefully selected to ensure compatibility with historic buildings in the Mesa Verde Administrative District, a National Historic Landmark (NHL).</p> <p>To reduce the impacts to historic interiors from chase-ways, grills, and vents, construction would be monitored by the park's historic officer at all times. If damage occurs, the contractor would be redirected to other procedures.</p> <p>Appropriate mitigation measures would be taken before and during construction in and near the museum building to ensure that artifacts and exhibits are protected from vibration, dust, light, and breakage. A curatorial staff member would consult with contractors prior to and during the construction of the project.</p>

TABLE 2: MITIGATION MEASURES AND BEST MANAGEMENT PRACTICES

Potential Adverse Effect	Mitigation Measure or Best Management Practice
Direct effects from construction-related activities on threatened and endangered species, wildlife, and rare plants	<p>A qualified biologist would identify the rare plant species, Schmoll's milkvetch, that could be directly affected by the project and would investigate the potential for avoiding or relocating those individual plants.</p> <p>Other rare plants that are identified adjacent to areas affected by the project would be marked and protected with fencing or other means.</p> <p>Cessation of construction and stabilization activities at night would allow birds and the threatened Mexican spotted owl to roost and forage in the areas near the project without disturbance.</p>
Direct effects from construction on natural soundscape	Construction activity would be restricted to daytime hours to allow for periods of time to experience the natural soundscape on Chapin Mesa.
Construction-related effects to soils	To reduce impacts on soil resources, soils removed during construction would be stockpiled, topsoils protected, and then replaced by rototilling or dragging compacted area.
Direct effects from construction activities on park operations	To limit effects of the HVAC project on park operations, the park would provide adequate training and orientation for construction personnel, reducing the burden on park personnel of managing and monitoring construction activities; schedule the construction work during low visitor use periods to lessen the burden on park staff, increasing their ability to manage and monitor ongoing construction efforts; schedule contractor activities to minimize conflict with daily park operation responsibilities and other associated park projects; and require the contractor to use all feasible “green” technologies for utility support to reduce impact on the park’s utility system and resources.
Increased public health and safety risks	<p>Proper signage and barriers would be posted in areas of construction in order to keep visitors a safe distance from construction activities and traffic.</p> <p>To the extent possible, construction would be scheduled during low visitor use periods.</p>

TABLE 2: MITIGATION MEASURES AND BEST MANAGEMENT PRACTICES

Potential Adverse Effect	Mitigation Measure or Best Management Practice
	<p>The contractor would be required to conduct daily tail-gate worker safety sessions. These meetings would emphasize travel safety to and from the site and remind workers that visitors may be focused more on the scenery than on the traffic.</p> <p>Speed limits would be strictly enforced for construction workers and drivers of construction trucks.</p> <p>At the park entrance, drivers of construction-related trucks would be reminded of the need to be courteous and patient in their driving, to use pull-offs, and to exercise additional caution at high visitor use areas.</p>
Direct effects from construction activities on the visitor experience	<p>Construction activities would be scheduled to avoid high visitor use periods.</p> <p>Construction areas would be demarcated and alternate routes with accompanying signage would be provided to direct visitors into park facilities while avoiding construction.</p> <p>Contractor equipment and vehicles would, to the extent possible, be stored in areas with little visitor activity (i.e., behind concession buildings) and access the project area through low profile maintenance roads.</p> <p>Contractors would be monitored, educated, and trained to lessen the adverse effects of construction activities on visitor use and experience.</p>

HOW THE ALTERNATIVES MEET THE OBJECTIVES OF THE PROPOSED ACTION

The objectives of the proposed action involve alleviating the problems in the headquarters area to develop a safer and more pleasant environment for visitors and park staff. These include creating comfortable temperatures and humidity levels in the buildings for visitors and park staff and to preserve cultural resources. The most important objective of the proposed action is to safeguard the natural and cultural resources in the area for the enjoyment of future generations.

Table 3 presents these objectives and the ability of the alternatives to meet them, based on the information presented in the “Affected Environment and Environmental Consequences” section.

TABLE 3: OBJECTIVES, AND THE ABILITY OF THE ALTERNATIVES TO MEET THEM

Objective	Alternative A: No Action Alternative	Alternative B: Preferred Alternative
Replace or repair the presently deficient heating and cooling system so that it can provide a climate adequate for human comfort and preservation of cultural resources and artifacts	Routine maintenance and repairs are not sufficient to improve the present system so that it would provide adequate temperatures and humidity levels in the buildings.	The installation of a new HVAC system would provide comfortable conditions inside buildings and would maintain the temperature and humidity levels to prevent degradation of cultural resources from climate extremes.
Protect human life, property, and designated resources, both natural and cultural	The potential for a fire would continue to exist from the present heating system, posing a threat to human life, property, and natural and cultural resources.	This alternative would reduce the threat of fire by removing existing boilers in the historic buildings.
Use cost-effective, environmentally sensitive equipment to reduce impacts on natural and cultural resources	The present underground fuel storage tanks would continue to pose a risk of soil contamination, and the boilers would continue to be a fire threat to historic structures and cultural resources.	Under this alternative, soil contamination from the storage tanks and the threat of fire from the boilers would no longer be a concern after they are removed.

COMPARISON OF ALTERNATIVE EFFECTS

Table 4 presents a summary comparison of the effects of the alternatives on park resources. Definitions of the terms used to describe the magnitude of the effects (e.g., negligible, minor, moderate, and major) are presented in Table 5 in the “Methodology” section. More detailed information on the effects of the alternatives is provided in the “Affected Environment and Environmental Consequences” section.

TABLE 4: COMPARISON OF IMPACTS OF ALTERNATIVES

Impact Topic	Alternative A No Action Alternative	Alternative B Preferred Alternative
Endangered, threatened, or protected species and critical habitats	The No Action Alternative would not affect any endangered, threatened, protected or candidate species or designated critical habitats in Mesa Verde National Park.	Because it is highly unlikely that owls are regularly active in the immediate project area, and nearby undeveloped areas with preferred habitat elements are available to support all the owl's normal activities, any effects associated with Alternative B related to the removal of habitat and construction-related disturbance would be discountable. Therefore, the proposed action may affect, but is not likely to adversely affect, the Mexican spotted owl.
Natural soundscape	The No Action Alternative would have a negligible, long-term, adverse impact on the natural soundscape from continued use of systems used to heat and cool the park headquarters, the Chief Ranger's Office, and the museum. The noise is not expected to be noticeable above the everyday human-caused noise level associated with employee and visitor use of the area.	Alternative B would have a short-term, local, negligible to moderate adverse effect on the natural soundscape as a result of noise or disturbance associated with construction and installation of a new HVAC system on Chapin Mesa. The duration of the higher intensity adverse impacts would be short and limited to daytime hours, when impacts to the natural soundscape would be considered more acceptable. Noise generated from operation of the new HVAC system, in particular noise associated with cooling tower fans, would result in long-term, negligible to minor, adverse effects.
Soils	Under Alternative A, the continued use of underground fuel storage tanks, which results in contamination of soils from spills, would have a long-term, negligible, adverse local effect on soils. Because of the age of the tanks, the potential for tank ruptures would increase over time and this would have a minor to moderate adverse effect on soils in the Chapin Mesa area.	Overall, the installation of the new HVAC system would have a long-term, negligible, adverse effect on soil resources because of the small area affected by construction, and because impacts would occur in an area that has been previously disturbed. Removal of the four underground fuel tanks would have a long-term, negligible, beneficial effect on soils as the soil contamination that occurs during refilling of the tanks would be eliminated and the area restored. Benefits could range up to moderate as the potential for a large leak or rupture of the tanks would be eliminated.

TABLE 4: COMPARISON OF IMPACTS OF ALTERNATIVES

Impact Topic	Alternative A No Action Alternative	Alternative B Preferred Alternative
Vegetation	Under Alternative A, the spills that occur during refilling of underground fuel tanks would result in the loss of individual plants and prevent re-establishment of plants in the future in a small area around the fuel spout. This would result in long-term, negligible, adverse effects on vegetation. Due to the age of the tanks and the proximity to a steep slope, the potential for large leaks or ruptures of the tanks would increase over time and this would have a long-term, minor to moderate, adverse local effect on vegetation.	Overall, the installation of a new centralized HVAC system would have a long-term, negligible, adverse effect on vegetation because of previous surface disturbance and the limited size (2,000 square feet) of the area to be impacted. Restoration of the small area around the four underground storage tanks with native vegetation would have a negligible, beneficial effect on vegetative resources in the area.
Wildlife and habitats	The No Action Alternative would not affect wildlife populations or habitat conditions in Mesa Verde National Park.	Short-term, negligible, adverse effects to wildlife would result from noise and disturbance during construction-related activities. The development of the central HVAC building would result in a long-term, adverse effect due to the removal of wildlife habitat in that area, but this effect would be negligible because of the small size of the building.
Cultural resources	Because no construction is indicated under Alternative A, adverse effects of Alternative A on archeological, ethnographic, historical, and landscape resources would be negligible, except where aging systems may pose a fire danger, a direct, short-term, moderate, adverse impact. Long-term, adverse impacts of inadequate interior climatic conditions on collections and on artifacts/exhibits in the museum and valued by tribes would be moderate to major in intensity. No effect on tribal relations would be anticipated. The contribution of Alternative A to regional cumulative effects would be negligible. This alternative would not involve any construction activities. Therefore, it would have a negligible effect on sites that are valued by Native American tribes.	With mitigation, implementation of the preferred alternative would result in local, long-term, negligible to minor, adverse impacts on archeological resources. With mitigating measures, implementation of this alternative would have both long-term adverse and beneficial impacts of minor intensity on the historic buildings. With mitigating measures, installation of the new HVAC system would have no adverse impact on historic structures so long as it is clearly distinguishable as new construction (introduction of non-historic elements into a NHL District would be done in a non-intrusive way). The new HVAC building's stone façade and wood window frames would be kept as simple as possible. Replacement of inadequate and unsafe systems would have long-term, minor, beneficial effects on the buildings.

TABLE 4: COMPARISON OF IMPACTS OF ALTERNATIVES

Impact Topic	Alternative A No Action Alternative	Alternative B Preferred Alternative
		<p>Although the new HVAC structure is somewhat shielded from public view, its façade would still detract from the historic scene. Introduction of a non-historic structure into this historic landscape setting would be partially mitigated by the building location, design, and materials and by vegetative screening, resulting in minor, long-term, adverse impacts to the integrity of the historic district and its landscape.</p> <p>Short-term, adverse impacts on collections during construction would be negligible; installation of new systems would provide long-term, moderate, beneficial impacts.</p> <p>No ethnographic sites have been identified in the area of potential effect, and because the amount of new ground disturbance is very low, only negligible, adverse impacts on sites or artifacts valued by Native American tribes would be expected. By improving the HVAC systems in the museum, exhibits, artifacts, and archival materials important to the affiliated tribes would be better preserved, representing a minor to moderate beneficial effect.</p>
Park operations	Alternative A, the continued use of the existing heating and cooling system for the museum, headquarters, and Chief Ranger’s office, would continue to have a long-term, minor, adverse effect on park operations by increasing maintenance costs and labor in maintaining an old, inefficient heating and cooling system.	Alternative B would have a long-term, moderate, beneficial effect on park operations by providing an efficient, reliable, state-of-the-art heating and cooling system. The maintenance burden with the new system would be significantly less when compared to maintaining the existing 30-year-old heating and cooling system.

TABLE 4: COMPARISON OF IMPACTS OF ALTERNATIVES

Impact Topic	Alternative A No Action Alternative	Alternative B Preferred Alternative
Public health and safety	The No Action Alternative would continue to have a long-term, minor, adverse effect on public health and safety as a result of heat-related health risks to visitors and park staff and increased fire potential.	Alternative B would result in long-term, minor, beneficial effects on public health and safety through elimination of heat-related discomfort and potential health problems by installing an adequate and reliable HVAC system and reducing the risk of fire through removal of the boilers and underground fuel storage tanks (possible ignition sources). Construction-related activities could lead to short-term, negligible to minor, adverse effects on public health and safety because of the potential for accidents; however, best management practices would be implemented to minimize these risks.
Visitor use and experience	<p>The lack of air conditioning in the museum during the peak summer season would continue to represent a short- and long-term, minor to moderate, adverse effect on the quality of the visitor experience. Museum visitors, approximately 350,000 per year, would continue to be subjected to 90+ degree temperatures during the summer season with the potential adverse effect of reducing the length of stay in this interpretive/educational facility.</p> <p>The fumes from the two underground fuel storage tanks for the museum heating system have a short- and long-term, minor, adverse effect on visitors. These fuel tanks, located adjacent to the museum, create unpleasant odors for visitors entering and exiting the museum.</p>	<p>This action of temporarily removing the asphalt sidewalks/crosswalk to install new HVAC underground lines would have a short-term, minor to moderate, adverse effect on the visitor experience because approximately 280 feet of the existing asphalt sidewalk system, located in front of and on both approaches to the museum/bookstore, would be temporarily removed to allow for installation of the new HVAC system.</p> <p>The installation of the new HVAC system would have a short-term, minor, adverse effect on visitors because of the disruptive activities associated with the removal of the existing buried fuel tanks located adjacent to the museum.</p> <p>In the long-term, the new HVAC system would have a moderate, beneficial effect on the quality of the visitor experience for approximately 350,000 visitors per year because during high use summer months, museum visitors would have a more comfortable environment in which to enjoy the museum, potentially increasing their length of stay in the museum. Also, the removal of fuel tanks located adjacent to the museum would have a long-term, minor, beneficial effect by eliminating fumes and odors associated with venting pipes and spillage that</p>

TABLE 4: COMPARISON OF IMPACTS OF ALTERNATIVES

Impact Topic	Alternative A No Action Alternative	Alternative B Preferred Alternative
		<p>presently occurs during refilling operations, and by eliminating the disruption of visitor flow into and out of the museum caused by the refilling operation.</p> <p>The activity associated with the construction of the central HVAC utility building would have a short-term, negligible to minor, adverse effect because of the proximity of the construction site to the visitor use area. Once completed, the central HVAC utility building would have a long-term, negligible effect on the visitor experience because it would be located behind the library and be only partially visible from the visitor use area.</p>

ENVIRONMENTALLY PREFERRED ALTERNATIVE

Environmentally preferable is defined as “the alternative that would promote the national environmental policy as expressed in the National Environmental Policy Act’s Section 101. Ordinarily, this means the alternative that causes the least damage to the biological and physical environment; it also means the alternative which best protects, preserves, and enhances historic, cultural, and natural resources” (CEQ 1981).

Section 101 of the National Environmental Policy Act states that “... it is the continuing responsibility of the Federal Government to ... (1) fulfill the responsibilities of each generation as trustee of the environment for succeeding generations; (2) assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings; (3) attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences; (4) preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity, and variety of individual choice; (5) achieve a balance between population and resource use which would permit high standards of living and a wide sharing of life’s amenities; and (6) enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.” The environmentally preferable alternative for the proposed Mesa Verde National Park HVAC project is based on applying these national environmental policy goals to the evaluation and decision-making processes.

Alternative B, the preferred alternative, would attain the widest range of beneficial uses of the environment, biological and cultural resource protection, and visitor safety and enjoyment, without degradation of resources. Alternative B would provide a higher level of protection for cultural resources compared to the No Action Alternative. The replacement of the current heating and cooling system would improve the museum’s curatorial facilities by controlling humidity and providing for appropriate temperature controls. These improved facilities would help to preserve irreplaceable artifacts and specimens for future scientific study and visitor education and enjoyment.

Removal of old and deteriorating underground fuel tanks would reduce the potential for contamination of subsurface archeological resources. Known archeological sites would not be affected by Alternative B. Removal of the boilers would reduce the potential for fires that could damage or destroy historic structures that form part of the Mesa Verde Administrative District, a National Historic Landmark.

The No Action Alternative would not fully meet the park's management objective to conserve cultural artifacts and provide for the safety and enjoyment of park resources by visitors. Under the No Action Alternative, resource impacts would be expected to increase with continued deterioration of the existing heating/cooling system. The existing system does not provide appropriate conditions for curation of artifacts and displays. Adverse effects on the visitors' experience as well as risks to public health and safety would likely increase under this alternative due to the temperature extremes in the museum. Thus the No Action Alternative does not meet national environmental policy goals as well as the preferred alternative.

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

METHODOLOGY

For each impact topic, the analysis includes a brief description of the affected environment and an evaluation of the effects of implementing each alternative. The impact analyses were based on information provided by park staff, relevant references and technical literature citations, and subject matter experts. The impact analyses involved the following steps.

- Define issues of concern, based on internal and external scoping.
- Identify the geographic area that could be affected.
- Compare the area of potential effect with the resources that are present.
- Identify mitigation measures that may be employed to offset or minimize potential adverse impacts (Table 2).
- Identify the intensity, context, duration (short- or long-term), and type (direct or indirect) of effect, both as a result of this action and from a cumulative effects perspective. (Indirect effects occur after implementation of the proposed action and/or are spatially removed from the proposed action.) Identify whether effects would be beneficial or adverse. The criteria used to define the intensity of impacts (negligible, minor, moderate, or major) associated with the alternatives are presented in Table 4.

CULTURAL RESOURCE ANALYSIS METHOD

Impacts to cultural resources are described in terms of type, context, duration, and intensity, as described above, which is consistent with the regulations of the Council on Environmental Quality (CEQ 1978) that implement the National Environmental Policy Act. These impact analyses also are intended to comply with the requirements of both the National Environmental Policy Act and Section 106 of the National Historic Preservation Act. In accordance with the Advisory Council on Historic Preservation's regulations implementing Section 106 of the National Historic Preservation Act (36 *Code of Federal Regulations* Part 800, Protection of Historic Properties), impacts to cultural resources were identified and evaluated by:

- Determining the area of potential effects,

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

- Identifying cultural resources present in the area of potential effects that are either listed in or eligible to be listed in the National Register of Historic Places,
- Applying the criteria of adverse effect to affected cultural resources either listed in or eligible to be listed in the National Register, and
- Considering ways to avoid, minimize or mitigate adverse effects.

Under the Advisory Council's regulations, a determination of either *adverse effect* or *no adverse effect* must also be made for affected cultural resources. An *adverse effect* occurs whenever an impact alters, directly or indirectly, any characteristic of a cultural resource that qualifies it for inclusion in the National Register. For example, this could include diminishing the integrity of the resource's location, design, setting, materials, workmanship, feeling, or association. Adverse effects also include reasonably foreseeable effects caused by the alternative that would occur later in time, be farther removed in distance or be cumulative (36 *Code of Federal Regulations* Part 800.5, *Assessment of Adverse Effects*). A determination of *no adverse effect* means there could be an effect, but the effect would not diminish in any way the characteristics of the cultural resource that qualify it for inclusion in the National Register.

Council on Environmental Quality regulations (CEQ 1978) and *Director's Order #12 and Handbook: Conservation Planning, Environmental Impact Analysis, and Decision Making* (NPS 2001) call for a discussion of the appropriateness of mitigation, as well as an analysis of how effective the mitigation would be in reducing the intensity of a potential effect, such as reducing the intensity of an impact from major to moderate or minor. Any resulting reduction in intensity of impact by mitigation, however, is an estimate of the effectiveness of mitigation under the National Environmental Policy Act only. It does not suggest that the level of effect as defined by Section 106 is similarly reduced. Although adverse effects under Section 106 may be mitigated, the effect remains adverse.

A Section 106 summary is included in the impact analysis for cultural resources. The summary is intended to meet the requirements of Section 106 and is an assessment of the effect of implementing the alternative on cultural resources, based on the criteria of effect and adverse effect found in the Advisory Council's regulations.

CUMULATIVE EFFECTS ANALYSIS METHOD

The Council on Environmental Quality (CEQ 1978) regulations for implementing the National Environmental Policy Act require assessment of cumulative effects in the decision-making process for federal projects. Cumulative effects are de-

defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 *Code of Federal Regulations* 1508.7). Cumulative effects are considered for both the no action and proposed action alternatives.

Cumulative effects were determined by combining the effects of the alternative with other past, present, and reasonably foreseeable future actions. Therefore, it was necessary to identify other past, ongoing, or reasonably foreseeable future actions at Mesa Verde National Park and in the surrounding region. Other actions that have the potential to have a cumulative effect in conjunction with installation of a new HVAC system are described below:

- Possible future modification of the Far View Terrace patio. Currently, the patio is on the back of the restaurant and faces the housing area. Options that have been proposed for remodeling the restaurant include expanding the patio in its current location or moving the patio to the front side of the building where visitors could have a panoramic view looking toward the Far View Lodge and Far View Visitor Center. Establishing plantings between the restaurant and the housing area to provide better visual and sound separation also has been proposed.
- Rehabilitation or reconstruction of the Far View Lodge. This project currently is in the planning stage. It could include rehabilitating the existing lodge and lodging units, demolishing the existing facilities and constructing a new lodge and lodging units, or rehabilitating the existing lodge and constructing new lodging units. Regardless of the selected approach, the operation of the lodge would change from its current summer-only to year-round use. This would increase the need for housing in the park for both National Park Service and concessioner staff, and particularly in the Far View area, during the winter.
- Future use of the CCC Camp Historic District for visitor activities. The historic recreation hall in this area occasionally is used for visitor functions. A CCC barracks building, referred to both as the Jack Ray and Barracks No. 5, may be used for public purposes, including interpretation, in the future.
- Future construction of employee housing. An environmental assessment recently was prepared on the construction of a new employee housing in Mesa Verde National Park. The action would result in the removal of existing trailers and the construction of new permanent housing. The preferred alternative would involve the construction of 7 new housing units in the Far View area and 9 new units in the Morefield area. This alternative also includes development of parking areas and new sidewalks to provide access to the housing units and installation of utility lines.
- Future construction of a cultural center. An environmental assessment and assessment of effect (NPS 2002b) recently was prepared on the construction of a new cultural center for Mesa Verde National Park. The preferred alternative would involve a new 96,000-square-foot facility constructed on land

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

owned by the Mesa Verde Foundation adjacent to the entrance to the park on U.S. Highway 160. The cultural center would incorporate administrative, curatorial, artifact storage, exhibition, and visitor center elements in one location. Resources would include:

- Curation storage, work areas, and a library.
- A multi-purpose conference area and classroom space that could be used in conjunction with a remodeled Far View Lodge.
- Offices for the superintendent and division chiefs, program offices, law enforcement base operations, and administrative operations.
- Building and grounds maintenance areas.
- Staff and conference lunchroom and break areas.
- Space for Mesa Verde Museum Association sales.
- Outdoor facilities, including 36,000 square feet of interpretive plazas and a large amphitheater.

IMPAIRMENT ANALYSIS METHOD

Management Policies 2001 (NPS 2000a) requires analysis of potential effects to determine whether or not actions would impair park resources or values.

The fundamental purpose of the national park system, established by the Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve park resources and values. National Park Service managers must always seek ways to avoid, or to minimize to the greatest degree practicable, actions that would adversely affect park resources and values.

These laws give the National Park Service the management discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, so long as the impact does not constitute impairment of the affected resources and values. Although Congress has given the National Park Service the management discretion to allow certain impacts within parks, that discretion is limited by the statutory requirement that the National Park Service must leave park resources and values unimpaired, unless a particular law directly and specifically provides otherwise.

The prohibited impairment is an impact that, in the professional judgment of the responsible National Park Service manager, would harm the integrity of park re-

sources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. An impact to any park resource or value may constitute an impairment. Impairment may result from National Park Service activities in managing the park, from visitor activities, or from activities undertaken by concessionaires, contractors, and others operating in or out of the park. An impact would be more likely to constitute an impairment to the extent that it has a major or severe adverse effect upon a resource or value whose conservation is:

- Necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park;
- Key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or
- Identified as a goal in the park's general management plan or other relevant NPS planning documents.

An impairment determination is included in the impact analysis section for all impact topics relating to the park's natural and cultural resources and values.

TABLE 5: DEFINITIONS OF IMPACT THRESHOLDS

Impact Topic	Impact Threshold Definition				Duration
	Negligible	Minor	Moderate	Major	
Endangered, threatened, or protected species and critical habitats	The proposed action would not affect listed species or designated critical habitat at any detectable level, or would be discountable.	May affect, not likely to adversely affect: Effects on listed species or designated critical habitat would be discountable (i.e., adverse effects are unlikely to occur or could not be meaningfully measured, detected, or evaluated) or completely beneficial.	May affect, likely to adversely affect: Adverse effects to a listed species or designated critical habitat might occur as a result of the proposed action and the effect would either not be discountable or completely beneficial. Moderate impacts to species would result in a local population decline due to reduced survivorship, declines in population, and/or a shift in the distribution; no casualty or mortality would occur.	Likely to jeopardize the continued existence of a species or adversely modify critical habitat: Effects could jeopardize the continued existence of a listed or proposed species or adversely modify designated critical habitat within and/or outside the park boundaries. Major impacts would involve a disruption of habitat or breeding grounds of a listed species such that casualty or mortality would result in removal of individuals of a protected species from the population.	Short-term – Effects during project implementation activities plus one year for population, community, or designated critical habitat recovery. Long-term – Effects extend beyond project implementation activities and last longer than one year in the case of population, community, or designated critical habitat recovery.

TABLE 5: DEFINITIONS OF IMPACT THRESHOLDS

Impact Topic	Impact Threshold Definition				Duration
	Negligible	Minor	Moderate	Major	
Natural soundscape	Natural sounds pre-dominate. Noise impacts would not be audible in most of the Chapin Mesa area. Where noise would be audible, it would be for short durations with significantly lengthy periods of time that would be noise-free. Noise would not be audible between sunset and sunrise.	Natural sounds would usually predominate. Noise impacts would not be audible in most of the Chapin Mesa area. Where noise would be audible, impacts would occur for short durations frequently during the day, and noise would be occasionally audible between sunrise and sunset.	Natural sounds would compete with human-caused sounds. Noise impacts would be commonly audible in some areas of Chapin Mesa for up to half the daylight hours. In locations where noise would be commonly audible, it may occur occasionally between sunset and sunrise.	Natural sounds would be dominated by human-caused sounds. In some areas of Chapin Mesa, natural sounds would be commonly impacted by noise during extended periods of time and frequently between sunset and sunrise.	Short-term – Occurs only during the duration of the project. Long-term – Persists beyond the duration of the project.
Soil	Soils would not be affected or the effects to soils would be below or at the lower levels of detection. Any effects to soil productivity or fertility would be slight and would occur in a relatively small area.	The effects to soils would be detectable. Effects to soil productivity or fertility would be small, as would the area affected. If mitigation were needed to offset adverse effects, it would be relatively simple to implement and likely successful.	The effect on soil productivity or fertility would be readily apparent and result in a change to the soil character over a relatively wide area. Mitigation measures would probably be necessary to offset adverse effects and would likely be successful.	The effect on soil productivity or fertility would be readily apparent and substantially change the character of the soils over a large area in and out of the park. Mitigation measures to offset adverse effects would be needed and extensive, and their success could not be guaranteed.	Short-term – Recovers in less than 3 years. Long-term – Takes more than 3 years to recover.

TABLE 5: DEFINITIONS OF IMPACT THRESHOLDS

Impact Topic	Impact Threshold Definition				Duration
	Negligible	Minor	Moderate	Major	
Vegetation	No native vegetation would be affected, or some individual native plants could be affected as a result of the alternative, but there would be no measurable or perceptible changes in plant community size, integrity, or continuity.	Effects on native plants would be measurable or perceptible, but would be localized within a small area. The viability of the plant community would not be affected and the community, if left alone, would recover. Mitigation to offset adverse effects, including special measures to avoid affecting species of special concern, could be required and would be effective.	A change would occur over a relatively large area in the native plant community that would be readily measurable in terms of abundance, distribution, quantity, or quality. Mitigation to offset adverse effects could be extensive, but would likely be successful.	Effects on native plant communities would be readily apparent and would substantially change vegetation community types over a large area. Mitigation measures to offset the adverse effects would be required and extensive, and success of the mitigation measures would not be guaranteed.	Short-term – Recovers in less than 3 years. Long-term – Takes more than 3 years to recover.
Wildlife and habitats	Wildlife and their habitats would not be affected or the effects would be at or below the level of detection and would not be measurable or of perceptible consequence to wildlife populations.	Effects to wildlife or habitat would be measurable or perceptible, but localized within a small area. While the mortality of an individual animal might occur, the viability of wildlife populations would not be affected and the community, if left alone, would recover.	A change in wildlife populations or habitat would occur over a relatively large area. The change would be readily measurable in terms of abundance, distribution, quantity, or quality of population. Mitigation measures would be necessary to offset adverse effects, and they would likely be successful.	Effects to wildlife populations or habitat would be readily apparent, and would substantially change wildlife populations over a large area in and out of the national park. Extensive mitigation would be needed to offset adverse effects, and the success of mitigation measures could not be assured.	Short-term – Recovers in less than 1 year after project completion. Long-term – Takes more than 1 year to recover after project is complete.

TABLE 5: DEFINITIONS OF IMPACT THRESHOLDS

Impact Topic	Impact Threshold Definition				Duration
	Negligible	Minor	Moderate	Major	
Cultural resources	The effect is at the lowest levels of detection – barely perceptible and not measurable.	For archeological resources, the impact affects an archeological site(s) with modest data potential and no significant ties to a living community's cultural identity. The impact does not affect the character defining features of a National Register of Historic Places eligible or listed structure, district, or cultural landscape.	successful. For archeological resources, the impact affects an archeological site(s) with high data potential and no significant ties to a living community's cultural identity. For a National Register eligible or listed structure, district, or cultural landscape, the impact changes a character defining feature(s) of the resource but does not diminish the integrity of the resource to the extent that its National Register eligibility is jeopardized.	For archeological resources, the impact affects an archeological site(s) with exceptional data potential or that has significant ties to a living community's cultural identity. For a National Register eligible or listed structure, district, or cultural landscape, the impact changes a character defining feature(s) of the resource, diminishing the integrity of the resource to the extent that it is no longer eligible to be listed in the National Register.	Short-term – Treatment effects on the natural elements of a cultural landscape may be comparatively short-term (e.g., 3 to 5 years) until new vegetation grows or historic plantings are restored. Long-term – Because most cultural resources are non-renewable, any effects on archeological, historic, or ethnographic resources, and on most elements of a cultural landscape, would be long-term.

TABLE 5: DEFINITIONS OF IMPACT THRESHOLDS

Impact Topic	Impact Threshold Definition				Duration
	Negligible	Minor	Moderate	Major	
Park operations	Park operations would not be affected or the effect would be at or below the lower levels of detection, and would not have an appreciable effect on park operations.	The effect would be detectable but would be of a magnitude that would not have an appreciable adverse or beneficial effect on park operations. If mitigation were needed to offset adverse effects, it would be relatively simple and likely successful.	The effects would be readily apparent and would result in a substantial change in park operations in a manner noticeable to staff and the public. Mitigation measures would probably be necessary to offset adverse effects and would likely be successful.	The effects would be readily apparent and would result in a substantial change in park operations in a manner noticeable to staff and the public and be markedly different from existing operations. Mitigation measures to offset adverse effects would be needed, would be extensive, and their success could not be guaranteed.	Short-term – Occurs only during the duration of the project. Long-term – Persists beyond the duration of the project.
Public health and safety	Public health and safety would not be affected, or the effects would be at low levels of detection and would not have an appreciable effect on the public health or safety.	The effect would be detectable, but would not have an appreciable effect on public health and safety. If mitigation were needed, it would be relatively simple and likely successful.	The effects would be readily apparent, and would result in substantial, noticeable effects to public health and safety on a local scale. Mitigation measures would probably be necessary and would likely be successful.	The effects would be readily apparent, and would result in substantial, noticeable effects to public health and safety on a regional scale. Extensive mitigation measures would be needed, and their success would not be guaranteed.	Short-term – Occurs only during the duration of the project. Long-term – Persists beyond the duration of the project.

TABLE 5: DEFINITIONS OF IMPACT THRESHOLDS

Impact Topic	Impact Threshold Definition				Duration
	Negligible	Minor	Moderate	Major	
Visitor use and experience	Visitors would not be affected, or changes in visitor use and/or experience would be below or at the level of detection. Any effects would be short-term. The visitor would not likely be aware of the effects associated with the alternative.	Changes in visitor use and/or experience would be detectable, although the changes would be slight. The visitor would be aware of the effects associated with the alternative, but the effects would be slight.	Changes in visitor use and/or experience would be readily apparent. The visitor would be aware of the effects associated with the alternative and would likely be able to express an opinion about the changes.	Changes in visitor use and/or experience would be readily apparent and have important consequences. The visitor would be aware of the effects associated with the alternative and would likely express a strong opinion about the changes.	Short-term – Effects occur only during project implementation activities. Long-term – Effects extend beyond project implementation activities.

ENDANGERED, THREATENED, OR PROTECTED SPECIES, AND CRITICAL HABITATS

AFFECTED ENVIRONMENT

Mesa Verde National Park is located within Montezuma County, Colorado, where 14 species of plants and animals are known to occur and are federally or state-listed as threatened, endangered, candidates for listing, or as a state species of special concern. Each of these species and their status is presented in Table 6.

TABLE 6: ENDANGERED, THREATENED, OR CANDIDATE SPECIES AND STATE SPECIES OF SPECIAL CONCERN IN MONTEZUMA COUNTY, COLORADO

Common Name	Scientific Name	Status ^{a/}
PLANTS		
Mancos milkvetch	<i>Astragalus humillimus</i>	FE
Mesa Verde cactus	<i>Sclerocactus mesae-verdae</i>	FT
Sleeping Ute milkvetch	<i>Astragalus tortipes</i>	FC
AMPHIBIAN		
Boreal toad	<i>Bufo boreas boreas</i>	FC, SE
FISH		
Colorado pikeminnow	<i>Ptychocheilus lucius</i>	FE, ST
Razorback sucker	<i>Xyrauchen texanus</i>	FE, SE
BIRDS		
Bald eagle	<i>Haliaeetus leucocephalus</i>	FT, ST
Gunnison sage grouse	<i>Centrocercus minimus</i>	FC, SC
Mexican spotted owl	<i>Strix occidentalis lucida</i>	FT, ST
Southwestern willow flycatcher	<i>Empidonax traillii extimus</i>	FE, SE
Yellow-billed cuckoo	<i>Coccyzus americanus occidentalis</i>	FC, SC
Whooping crane	<i>Grus americana</i>	FE, SE
MAMMALS		
Black-footed ferret	<i>Mustela nigripes</i>	FE, SE
Canada lynx	<i>Lynx canadensis</i>	FT, SE

^{a/} FE = federally endangered; FT = federally threatened; FC = federal candidate for listing; SE = state endangered; ST = state threatened; SC = state species of special concern

Only one federal or state-listed species is known to occur in the project area: the Mexican spotted owl (*Strix occidentalis lucida*), which has threatened status from both the U.S. Fish and Wildlife Service and the Colorado Division of Wildlife. The Mexican spotted owl is mottled in appearance, with irregular white and brown spots on its abdomen, back, and head. *Strix occidentalis* translates as “owl of the west”; *lucida* means “light” or “bright.” Unlike most owls, spotted owls have dark eyes, and several thin white bands mark an otherwise brown tail. Its distribution includes southern Utah and Colorado south through the mountains of Arizona, New Mexico, and west Texas into the mountains of central Mexico (USFWS 1995). In the vicinity of the project, Mexican spotted owls are known to nest in the canyons surrounding the Chapin Mesa developed area. There is evidence, based on the report of a park employee trained in identifying the owl’s call, that the Mexican spotted owl uses the habitat near the proposed project. This employee heard Mexican spotted owl calls during several nights in the headquarters area (San Miguel pers. comm. 2003).

The U.S. Fish and Wildlife Service has designated approximately 4.6 million acres of critical habitat for the owl on federal lands in Arizona, Colorado, New Mexico, and Utah. There is no designated critical Mexican spotted owl critical habitat in Mesa Verde National Park (USFWS 2001).

The Mexican Spotted Owl Recovery Plan (USFWS 1995), developed by the U.S. Fish and Wildlife Service, indicates that the highest quality Mexican spotted owl habitat can be represented by protected activity centers (PACs). These include an area of at least 600 acres, centered around the nest or prime roosting area, that includes the best nesting and roosting habitat in the area. Based on available data, the protected activity centers include, on average, 75 percent of the foraging area of an owl, and are typically formed within the preferred habitat type. Mexican spotted owls prefer habitats found in steep-walled, rocky canyons, with slopes having gradients greater than 40 percent, and in uneven-aged, multistoried forests with high canopy closure (USFWS 1995). Protected activity centers have not yet been mapped in the park; however, the natural resource specialist for Mesa Verde anticipates that when maps are developed, a Mexican spotted owl’s protected activity center would likely include the project area or a portion of the project area (San Miguel pers. comm. 2003).

IMPACTS OF ALTERNATIVE A - NO ACTION ALTERNATIVE

Analysis

Alternative A would not include any new action or land disturbance and would therefore not affect any endangered or threatened species or critical habitats that are protected under Section 7 of the Endangered Species Act.

CUMULATIVE EFFECTS

Alternative A would not affect endangered, threatened, protected, or candidate species, or designated critical habitats. Therefore, the No Action Alternative would not contribute to any cumulative effects.

CONCLUSION

The No Action Alternative would not affect any endangered, threatened, protected or candidate species, or designated critical habitats in Mesa Verde National Park.

Alternative A would not produce major adverse impacts on endangered, threatened, protected, or candidate species, or designated critical habitats whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general management plan or other NPS planning documents. Consequently, there would be no impairment of endangered, threatened, protected, or candidate species, or designated critical habitats as a result of the implementation of Alternative A.

IMPACTS OF ALTERNATIVE B - PREFERRED ALTERNATIVE

Analysis

There is potential for the Mexican spotted owl to occur within the area that would be affected by the proposed action. There has been some evidence of past owl activity in the headquarters area, and the project area is expected to be included in a protected activity center for the owl when mapping is completed. The proposed action would result in the removal of one or two 15-foot tall pinyon/juniper trees to make way for the central HVAC utility building. It is not known if the Mexican spotted owl uses these specific trees for roosting or foraging, although there is no evidence indicating that owls use these particular trees. The 550-square-foot area where the building would be constructed is not considered a preferred habitat type for the Mexican spotted owl due to the lack of closed-canopy, mixed conifer forest and the high degree of development and fragmentation. It is highly unlikely that owls are regularly active in the immediate project area.

The two 1,000-gallon propane tanks and the central HVAC building with cooling tower would not rise above other buildings in the area or above the vegetative canopy, and thus would not interfere with the owl's flight paths. The central HVAC building would be designed in a manner so that sound from the interior of the building would not be heard outside. Additionally, because the fan associated with the cooling tower would not be expected to run at night and construction for the proposed action would occur

during daylight hours (Cope pers. comm. 2003a), no nighttime noise would be produced. Therefore, no sound would be expected to interfere with the owl's nesting, roosting, or foraging activities in the surrounding area.

Areas containing the Mexican spotted owl's preferred habitat elements are available to support all the owl's normal activities near the high-density development in the headquarters area where the proposed action would be implemented and in the adjacent canyons that provide prime owl habitat. These prime and preferred habitats would not be affected by the proposed action. As a result, any effects associated with Alternative B related to the removal of habitat and construction-related disturbance in the developed headquarters area would be discountable. Therefore, the proposed action may affect, but is not likely to adversely affect, the Mexican spotted owl.

CUMULATIVE EFFECTS

Several past, present, and reasonably foreseeable actions with potential to affect listed species have occurred or are planned to occur within Mesa Verde National Park. The transportation plan and fire management activities may impact the Mexican spotted owl in the future. Thinning and prescribed burn activities associated with a fire management plan could potentially impact the Mexican spotted owl habitat. However, fire management actions that reduce the potential for habitat destruction have been identified as beneficial to the Mexican spotted owl (USFWS 2001). Specific transportation plans have not yet been developed, but the Chapin Mesa developed area would most likely undergo transportation improvements. The Chapin Mesa developed area contains the proposed project area and would likely be located within a Mexican spotted owl protected activity center, although inclusion in the protected activity center would be a result of proximity rather than because the area contains prime owl habitat. Effects of transportation improvements would be similar to anticipated effects of Alternative B, which would be discountable because of the less suitable habitat and the presence of nearby undeveloped areas with prime owl habitat. Therefore, this project would have a negligible contribution to any cumulative effects on the Mexican spotted owl.

CONCLUSION

Because it is highly unlikely that owls are regularly active in the immediate project area and nearby undeveloped areas with preferred habitat elements are available to support all the owl's normal activities, any effects associated with Alternative B related to the removal of habitat and construction-related disturbance would be discountable. Therefore, the proposed action may affect, but is not likely to adversely affect, the Mexican spotted owl.

Alternative B would not produce major adverse impacts on endangered, threatened, protected, or candidate species, or designated critical habitats whose conservation is (1)

AFFECTED ENVIRONMENT AND
ENVIRONMENTAL CONSEQUENCES

necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general management plan or other NPS planning documents. Consequently, there would be no impairment of endangered, threatened, protected, or candidate species, or designated critical habitats as a result of the implementation of Alternative B.

NATURAL SOUNDSCAPE

AFFECTED ENVIRONMENT

No ambient sound monitoring was conducted specifically for this project. The natural soundscape can be defined as "...usually composed of both natural ambient sounds and a variety of human-made sounds" (NPS 2000c). Noise, an element that can degrade the natural soundscape, is defined as "...unwanted or undesired sound, often unpleasant in quality, intensity or repetition....In a national park setting, noise is a subset of human-made noises" (NPS 2000c). Noise may vary in character from day to night, and from season to season. Natural soundscape is created by natural processes including, but not limited to, sound created by physical and biological components such as wind, weather, birds, and insects.

The opportunity to experience the natural soundscape is an important part of a positive park experience for some visitors. Mesa Verde National Park provides a unique and rare setting due to its remote location and remarkable environmental makeup, which provides an ambience of natural quiet and solitude.

Some human-caused sound can be considered acceptable in that it is attendant to purposes and uses for which the park was created. Director's Order #47, *Soundscape Preservation and Noise Management*, requires park units to determine the level of human-caused sound that is necessary for park purposes, and to achieve that level by reducing noise and restoring the natural soundscape to the greatest extent possible.

Sound can be perceived as noise because of loudness, frequency, duration, occurrence at unwanted times or from an unwanted source, or because it interrupts or interferes with a desired activity. A sound that is considered neutral or desirable by one person may be considered unpleasant noise by another person because of a perception of inappropriateness or disturbance. Noise can adversely affect park resources or values, including, but not limited, to natural soundscapes, wildlife, and visitor experience. It can directly impact them by modifying or intruding upon the natural soundscape, masking the natural sounds that are an intrinsic part of the environment.

The Chapin Mesa area experiences levels of human-caused sound associated with the development and use of the facilities. The complex is located in the Development Zone, as identified in the Mesa Verde National Park General Management Plan (NPS 1979). Because the complex provides services to visitors, noise levels greater than the natural ambient background level are considered acceptable within and adjacent to the complex. However, at certain times of the day or season, opportunities exist to experience solitude and quiet, and for noise levels to approach the natural ambient background level. The management focus of this zone is to maintain and protect historic resources, maintain visitor facilities, mitigate impacts from human use, and provide for a quality

visitor experience. Evidence of management activity and resource preservation is expected to be visible and audible by park visitors and is an accepted activity within this zone.

The human-made sounds that are present in the park include vehicles; human voices; and the use, maintenance, and operation of the buildings and mechanical systems associated with the complex facilities. Human-caused sound is typically higher between May and September, corresponding with high park visitation during these months.

IMPACTS OF ALTERNATIVE A - NO ACTION ALTERNATIVE

Analysis

Alternative A would continue the operation and maintenance of the existing system to heat and cool the park headquarters, the Chief Ranger's office, and the museum. The current heating and cooling system has very little effect on natural soundscapes. The boilers that supply heat to the buildings are located in the basements of each building, and the fuel tanks that supply the boilers are underground. These structures have little to no effect on the natural soundscape of the area because the noise they generate is buffered by the structures or the ground. The cooling system that supplies park headquarters is located outside of the building but does not generate noise that intrudes upon the natural soundscape (Cope pers. comm. 2003b). The air-handling machine that cools the Chief Ranger's office is also located outside of the building and runs periodically during the hot days of summer. This equipment can be heard in the general vicinity of the building when it is running (Cope pers. comm. 2003b). The level of noise, however, does not exceed the level associated with the visitor and employee use of the area. The long-term, adverse effect on natural soundscapes from the continued use of the current heating and cooling system would be negligible.

Cumulative Effects

There are no other development projects planned for the Chapin Mesa area in the near future that would combine with installation of the HVAC system to incrementally, adversely affect natural soundscapes in the area. The natural soundscapes in the Chapin Mesa area are impacted by visitor use of the area, including motor vehicles and buses. The level of noise from these sources is greater from May to September when visitor use is high. Development of a transportation plan could have a beneficial cumulative impact on the natural soundscape because if private vehicle use were reduced, the total noise related to motorized use would be reduced, thus lessening the impact on the natural soundscape. This benefit would be long-term and negligible, because private vehicles would still be permitted to access the Chapin Mesa area regardless of how the majority of visitors accessed the park. The beneficial effects of reduced vehicular use of the area

in the future may offset some of the negligible effects associated with continued use of the current heating and cooling system.

Conclusion

The No Action Alternative would have a negligible, long-term, adverse impact on the natural soundscape from continued use of systems used to heat and cool the park headquarters, the Chief Ranger's Office, and the museum. The noise is not expected to be noticeable above the everyday human-caused noise level associated with employee and visitor use of the area.

Alternative A would not produce major adverse impacts on the natural soundscape whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general management plan or other NPS planning documents. Consequently, there would be no impairment of the natural soundscape as a result of the implementation of Alternative A.

IMPACTS OF ALTERNATIVE B - PREFERRED ALTERNATIVE

Analysis

Alternative B would have an adverse impact on the natural soundscape as a result of noise generated during the construction activities associated with the installation of the new HVAC system. The short-term impacts would be limited to normal, daytime working hours, and would be localized in the area of the three buildings being upgraded. Because of the small scale of this project, the adverse effects on the natural soundscape during construction would be minor. There could, however, be very short periods when construction equipment would produce noise of sufficient intensity that the impact would be considered moderate, but these periods would be limited and, considering the nature of the developed zone, not entirely unexpected.

Equipment associated with the operation of the new HVAC system would generate noise that would affect natural soundscapes. The building to house the HVAC boilers, a chiller unit, pumps, and other associated machinery would be a concrete-walled, block building. The outer veneer of the building would be of stone. This design would buffer the natural soundscape from noise generated by the HVAC equipment housed in the new building. The cooling towers located outside of the central HVAC utility building would have a fan which would run periodically. The length of time the fan would run would be dependent upon the outside temperature, which on hot days would require the system to operate at a higher level to cool the inside of the buildings. Because temperatures decrease at night, the fan would likely not run then. The long-term effect on natural soundscapes from operation of the HVAC system would be negligible to minor and adverse.

Cumulative Effects

The construction activity associated with installing a new HVAC system would have short-term adverse effects that range up to moderate when noise from construction activity noticeably exceeds the natural sounds at Chapin Mesa. No other projects have been identified that would cumulatively contribute to the noise associated with the construction activity that would occur with implementation of Alternative B. The implementation of a transportation plan in the future may reduce the level of motor vehicle use in the area, resulting in a negligible, beneficial effect on natural soundscapes. The beneficial effect of the transportation plan would offset to some degree the negligible to minor adverse effects associated with the long-term operation of the HVAC system.

Conclusion

Alternative B would have a short-term, local, negligible to moderate, adverse effect on the natural soundscape as a result of noise or disturbance associated with construction and installation of a new HVAC system on Chapin Mesa. The duration of the higher intensity adverse impacts would be short and limited to daytime hours, when impacts to the natural soundscape would be considered more acceptable. Noise generated from operation of the new HVAC system, in particular noise associated with cooling tower fans, would result in long-term, negligible to minor, adverse effects.

Alternative B would not produce major adverse impacts on the natural soundscape whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general management plan or other NPS planning documents. Consequently, there would be no impairment of the natural soundscape as a result of the implementation of Alternative B.

SOILS

AFFECTED ENVIRONMENT

There are four major categories of soils within Mesa Verde National Park. There is a basalt rockland complex that is located on rocky outcrops, cliffs, and steep talus slopes, and a rough broken land complex that is composed largely of shallow infertile soils, with some pockets of deeper, more fertile soil. There is also a sandstone outcrop complex composed of sandy soils with low moisture-holding capacity, with some deeper and very fertile soils. The last category, sandstone outcrop/stonyland complex, is composed of moderately deep to deep soils and develops on mesa bedrock with loess deposits (NPS 2002a). The soils in the immediate project area are a reddish-colored, wind-deposited loess (San Miguel pers. comm. 2001) and tend to be shallow, sandy soils with low moisture holding capability.

The area that would be affected by the proposed action consists of soils located in the headquarters portion of the Chapin Mesa developed area. This includes soils underlying and adjacent to four underground fuel storage tanks by each of the buildings and soils behind the library in the area of the proposed central HVAC utility building.

IMPACTS OF ALTERNATIVE A - NO ACTION ALTERNATIVE

Analysis

The four 500-gallon underground tanks that supply fuel to the boilers for the museum, headquarters, and Chief Ranger's office heating system require frequent filling. Spills during the refueling process have occurred in the past, which can be observed as soil stains below the fill spout. This has caused a local, negligible, adverse effect on soils in the immediate area. There would still be the potential for repeated spills with similar effects under Alternative A. Because of the age of the tanks and the deterioration that would occur over time with continued use under Alternative A, there is a potential for a large spill or tank leak to occur, contaminating soils in a larger area. In addition, all of these tanks are located near a steep slope, so potential for a tank rupture that would affect a large area could have a long-term, minor to moderate, adverse effect on downgradient soils.

Cumulative Effects

Soils in the project area have been impacted by developments that have increased the amount of impervious surfaces and a loss of soil productivity. Future park developments, including additional employee housing, visitor lodging facilities, and a new cultural center, could have a local, negligible to minor, adverse, cumulative impact on soil. These developments are small and would result in the loss and compaction of soils in

the local areas. The activities would occur in areas where soils have been previously disturbed. The negligible contribution of adverse effects on soils resulting from activities under Alternative A to the minor adverse effects of other park development would result in overall cumulative, minor, adverse effects.

Conclusion

Under Alternative A, the continued use of underground fuel storage tanks, which results in contamination of soils from spills, would have a long-term, negligible, adverse, local effect on soils. Because of the age of the tanks, through time the potential for tank ruptures increases and would have a minor to moderate, adverse effect on soils in the Chapin Mesa area.

Alternative A would not produce major adverse impacts on soil resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general management plan or other NPS planning documents. Consequently, there would be no impairment of soil resources or values as a result of the implementation of Alternative A.

IMPACTS OF ALTERNATIVE B - PREFERRED ALTERNATIVE

Analysis

The installation of the new HVAC system would have a long-term, negligible, adverse effect on soils. The new utility building, building service approach, and trenching for pipes in non-sidewalk areas would impact approximately 2,000 square feet of ground surface. Installation of the piping from the HVAC building to the three other buildings would utilize existing utility trenches and would not result in new ground disturbance. However, back filled and compacted trenches would result in temporary soils disturbance. Lines connecting the propane tanks to the central HVAC utility building would also use existing trenches. However, 550 square feet of previously undeveloped soils would be disturbed for development of the central HVAC building. Soils within that area would be removed up to 3 feet deep to lay the foundation and soils adjacent to the building footprint would be compacted due to heavy construction equipment and worker activity. Two 1000-gallon propane storage tanks near the utility building would be elevated on cement cradles, which would be placed on a 20-square-foot cement pad. Development of the cement pad would result in a loss of soils in this small area. In addition, best management practices, such as stockpiling and the protection of topsoils, would be employed during construction activities to reduce impacts on soil resources.

Alternative B would also result in the removal of the four aged underground fuel tanks that are adjacent to the buildings. Removal of these tanks would eliminate soil contami-

nation in the immediate area caused by fuel spills during refilling, and remove the potential for large leaks or tank ruptures that could contaminate areas on the mesa beyond the tanks. Soils that have been exposed to spilled fuels would be removed, and the area would be refilled with clean fill material and a layer of soil would be overlaid in an area of between 8 to 12 square feet at each tank and revegetated with native plant species. The removal of these tanks and the potential for large-scale leaking and restoration of the areas could result in beneficial effects ranging from negligible to moderate.

Cumulative Effects

Increased development within the park with regards to new employee housing, visitor lodging, and a new cultural center could further increase impervious surfaces and result in a loss of soil productivity within the park. Because the areas being developed have been previously disturbed and the footprint would be small, the adverse effects would be negligible to minor. These impacts, when combined with the negligible adverse effect of Alternative B, would have a long-term, minor, adverse, cumulative effect on soils.

Conclusion

Overall, the installation of the new HVAC system would have a long-term, negligible, adverse effect on soil resources because of the small area affected by construction, and because impacts would occur in an area that has been previously disturbed. Removal of the four underground fuel tanks would have a long-term, negligible, beneficial effect on soils as the soil contamination that occurs during refilling of the tanks would be eliminated and the area restored. Benefits could range up to moderate as the potential for a large leak or rupture of the tanks would be eliminated.

Alternative B would not produce major adverse impacts on soil resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general management plan or other NPS planning documents. Consequently, there would be no impairment of soil resources or values as a result of the implementation of Alternative B.

VEGETATION

AFFECTED ENVIRONMENT

The area that would be affected by the proposed action can be generally described as the Chapin Mesa developed area. However, only a small portion (2,000 square feet) of the developed area is affected by the project. The project area has been heavily impacted by roads, parking lots, structures, and utility systems. The project area is dominated by two conifers: juniper (*Juniperus osteosperma*) and pinyon pine (*Pinus edulis*) (NRCS 1999). These trees rarely exceed 40 feet in height and are typically openly spaced woodland (Brown 1994). The area tends to be rocky, with thin soils predominating. The understory is typically composed of grasses and shrubs, dominated by Indian ricegrass (*Oryzopsis hymenoides*). Table 7 provides a list of the typical plant species occurring in the project area.

TABLE 7: COMMON PLANT SPECIES IN AREAS AFFECTED BY
INSTALLATION OF A NEW HVAC SYSTEM

Common Name	Scientific Name	Common Name	Scientific Name
Pinyon pine	<i>Pinus edulis</i>	Hood's phlox	<i>Phlox hoodii</i>
Utah juniper	<i>Juniperus osteosperma</i>	Slender buckwheat	<i>Eriogonum racemosum</i>
Antelope bitterbrush	<i>Purshia tridentata</i>	Pinyon knotweed	<i>Polygonum sawatchense</i>
Mutton-grass	<i>Poa fendleriana</i>	Schmoll's milkvetch	<i>Astragalus schmolliae</i>
Indian ricegrass	<i>Oryzopsis hymenoides</i>	Datil yucca	<i>Yucca baccata</i>
Squirreltail bottle-brush	<i>Sitanion hystrix</i>	Pinyon prickly pear	<i>Opuntia polycantha</i>
Low penstemon	<i>Penstemon linarioides</i>		

No federally listed threatened plant species are found in the project area. However, a rare plant species, Schmoll's milkvetch (*Astragalus schmolliae*), is found in the project area vicinity. This plant is abundant and is endemic to Chapin Mesa, and is listed as a “rare” species by the Colorado Natural Heritage Program. Its habitat includes sandy and gravelly flats and terraces, among juniper and pinyon pine, on sandstone. It exists in areas with an elevation between 6,800 and 7,000 feet (Spackman et al. 1997).

IMPACTS OF ALTERNATIVE A - NO ACTION ALTERNATIVE

Analysis

The four 500-gallon underground tanks that supply fuel to the boilers require frequent filling. Minor spillage does occur on occasion during the refilling operation, which alters the soil properties, results in mortality of individual plants in close proximity to the spout, and prevents establishment of plants in the future. Continued contamination of

the area by refilling of the tanks would cause a local, negligible, adverse effect on vegetation within an approximate 6-foot radius around the fill spout. Also, due to the age of the tanks, there is a potential for a large spill in the future in the event that the tanks leak or rupture. In the event of a large leak, the area of effect could be extensive, as these tanks are located on a steep slope, and contamination of the soils and loss of vegetation could extend down slope. This would have a long-term, minor to moderate, adverse effect on local vegetation.

Cumulative Effects

Vegetation in the project area and other areas of the park has been and will be impacted by developments that have increased the amount of impervious surfaces and resulted in a loss of vegetation. Because the areas being developed have been previously disturbed and the area affected would be small, future developments associated with new employee housing, a new cultural center, and visitor lodging would have long-term, adverse, negligible to minor effects on vegetative resources. Wildfires and fuels management in the park to reduce the risks to people and property from wildfire have modified plant assemblages in and near Chapin Mesa. The Chapin Mesa area was burned by wildfire in 2002, which removed vegetative cover in the area. Recent fuels management actions to protect park structures on Chapin Mesa have resulted in the removal of trees within the developed area. The actions of the recent wildfire and fuels reductions in the project area have resulted in a moderate, adverse impact on the vegetation on Chapin Mesa but a negligible to minor impact park-wide. The continued use of the current heating and cooling system into the future without substantial repair could result in adverse effects of a moderate level on vegetation in the area in the event of a large leak or rupture of the tanks. The potential for long-term, moderate adverse effects, when combined with the moderate adverse effects of other projects and the past effects of wildfire, would have a cumulatively moderate adverse effect on vegetation in the Chapin Mesa area. The effects would be considered long-term because of the arid environment, short-growing season, and because native plant establishment is slow.

Conclusion

Under Alternative A, the spills that occur during refilling of underground fuel tanks would result in the loss of individual plants and prevent re-establishment of plants in the future in a small area around the fuel spout. This would result in long-term, negligible, adverse effects on vegetation. Due to the age of the tanks and the proximity to a steep slope, the potential for large leaks or ruptures of the tanks increases over time and would have a long-term, minor to moderate, adverse, local effect on vegetation.

Alternative A would not produce major adverse impacts on vegetation resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general

management plan or other NPS planning documents. Consequently there would be no impairment of vegetation resources or values as a result of the implementation of Alternative A.

IMPACTS OF ALTERNATIVE B - PREFERRED ALTERNATIVE

Analysis

The installation of the new HVAC system would have a long-term, negligible, adverse effect on vegetation. The new utility building, building service approach, and trenching for pipes in non-sidewalk areas would impact approximately 2,000 square feet of ground surface. However, all the surface area that would be affected by this project to install piping has been disturbed by previous trenching. Vegetation would be removed and trampled during construction of the central HVAC utility building (550 square feet), installation of a cement pad for propane tanks (20 square feet), and removal of the asphalt walkways to install piping. These activities would result in the loss of individual plants and the placement of the new utility building and two additional 1,000-gallon propane tanks would result in the removal of one or two (15-foot tall) pinyon/juniper trees, but these actions would not affect the viability of any plant populations or communities. The rare plant species, Schmoll's milkvetch, would be identified before construction in an attempt to avoid disturbance; however, it is anticipated that some individual plants could be lost. Because the population is abundant on the mesa, a loss of a few individual plants would result in a long-term, negligible, adverse effect from a population standpoint (San Miguel pers. comm. 2003). Avoidance would be the highest priority to minimize impact.

Contractors would also have to use best management practices to protect soil resources in the area, such as stockpiling and protecting topsoils. This would help ensure that a suitable substrate for supporting revegetation would be available after construction is complete. After removal of the four underground storage tanks, the four areas (8 to 10 feet in diameter) would be restored and revegetated with native plants. This would have a long-term, negligible, beneficial effect.

Cumulative Effects

The past, current, and future activities that contribute to the adverse effects on vegetation in the area and park are the same as those described above under Alternative A. The negligible, adverse effects of installation of the new HVAC system, when combined with the moderate adverse effects on vegetative resources from recent wildfires and fuels management activities, would result in moderate adverse cumulative effects overall on vegetation in the Chapin Mesa area. The adverse effects to vegetative resources on the mesa would be offset to a negligible degree by revegetation of small areas on the mesa. Alternative B would result in the planting of native vegetation to screen the central

HVAC utility building and restoration of disturbed areas where the underground fuel tanks would be removed and where trailers are being removed on the Mesa as part of the new employee housing plan.

Conclusion

Overall, the installation of a new centralized HVAC system would have a long-term, negligible, adverse effect on vegetation because of previous surface disturbance and the limited size (2,000 square feet) of the area to be impacted. Restoration of the small area around the four underground storage tanks with native vegetation would have a negligible, beneficial effect on vegetative resources in the area.

Alternative B would not produce major adverse impacts on vegetation resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general management plan or other NPS planning documents. Consequently there would be no impairment of vegetation resources or values as a result of the implementation of Alternative B.

WILDLIFE AND HABITATS

AFFECTED ENVIRONMENT

The wildlife of Mesa Verde National Park is similar to wildlife in other semi-arid plateau regions of the southwestern United States. Typical native wildlife species found in the Chapin Mesa area are listed in Table 8. Several generalist species inhabit all or most of the vegetation types in the park, while more specialized species may be characteristic of a particular habitat.

The species diversity of the park is enhanced by the transitional nature of the communities spanning the deserts to the south and west and the forested mountains to the north. Wildlife migration corridors connect the park with other important wildlife habitat on adjoining lands.

The wildlife habitats in the developed area of Chapin Mesa already have been altered by many years of human activity and management actions. These activities have resulted in the disturbance of native vegetation and the introduction of non-native species. Wildfire, along with prescribed burning and thinning of trees and shrubs to reduce risks to people and property from wildfire, also has altered wildlife habitats. The proposed project footprint has been previously disturbed from thinning and emergency maintenance activities and consists of almost completely barren ground and one or two (15-foot tall) pinyon/juniper trees.

TABLE 8: COMMON ANIMAL SPECIES IN THE CHAPIN MESA AREA

Common Name	Scientific Name	Common Name	Scientific Name
Rock squirrel	<i>Citellus variegatus</i>	Plumbeous vireo	<i>Vireo plumbeus</i>
Pinyon mouse	<i>Peromyscus truei</i>	Spotted towhee	<i>Pipilo maculatus</i>
Nuttall's cottontail	<i>Sylvilagus nuttallii</i>	Gopher snake	<i>Pituophis melanoleucus</i>
Mule deer	<i>Odocoileus hemionus</i>	Sagebrush lizard	<i>Sceloporus graciosus</i>
Coyote	<i>Canis latrans</i>	Ant lion	Mymeleontidae
Gray fox	<i>Urocyon cinereoargenteus</i>	Bee-fly	Bombyliidae
Sharp-shinned hawk	<i>Accipiter striatus</i>	Ground beetle	Carabidae
Northern saw-whet owl	<i>Aegolius acadicus</i>	Tree cricket	Gryllidae
Bewick's wren	<i>Thryomanes bewickii</i>	Tarantula	Theraphosidae
Hairy woodpecker	<i>Picoides villosus</i>	Tarantula wasp	<i>Pepsis</i> sp.
Gray flycatcher	<i>Empidonax wrightii</i>	Digger wasp	<i>Ammophila</i> sp.
Common raven	<i>Corvus corax</i>	Velvet wasp	Mutillidae
Western scrub jay	<i>Aphelocoma coerulescens</i>	Robber fly	Asilidae
Broad-tailed hummingbird	<i>Selasphorus platycercus</i>	Tiger swallowtail butterfly	<i>Papilio</i> sp.
Black-throated gray warbler	<i>Dendroica nigrescens</i>		

IMPACTS OF ALTERNATIVE A - NO ACTION ALTERNATIVE

Analysis

Alternative A would not include any new land disturbance and would therefore not affect existing wildlife populations or habitat conditions. There would be no changes in wildlife populations or their supporting habitats.

Cumulative Effects

Alternative A would not cause any effects in existing wildlife populations or habitat conditions. Therefore, it would not contribute to any cumulative effects on wildlife populations or wildlife habitats.

Conclusion

The No Action Alternative would not affect wildlife populations or habitat conditions in Mesa Verde National Park.

Alternative A would not produce major adverse impacts on wildlife or habitats whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general management plan or other NPS planning documents. Consequently, there would be no impairment of wildlife or habitats as a result of the implementation of Alternative A.

IMPACTS OF ALTERNATIVE B - PREFERRED ALTERNATIVE

Analysis

Implementation of Alternative B would result in short-term, adverse effects on wildlife behavior from noise and disturbance related to construction activities associated with the development of the central HVAC building and installation of the utility lines. These effects would be considered negligible because of the limited scope of the project, the small area that would be disturbed, and the relatively short duration of construction (6 to 12 months). Also, effects from construction would not prevent wildlife from undertaking normal foraging, breeding, or resting activities in nearby areas with similar habitat elements.

The development of the central HVAC building would result in a long-term, adverse effect due to the removal of wildlife habitat in that area, but this effect would be negligible because of the small size of the building (only 550 square feet).

Cumulative Effects

Other past, present, and reasonably foreseeable construction projects that have or will take place in Mesa Verde National Park have similar impacts on wildlife associated with them. Increased development within the park with regard to new employee housing, visitor lodging, and new cultural center could have negligible to minor, adverse effects on wildlife as a result of removal of habitat and noise and disturbance from construction. The transportation plan has potential to affect wildlife in the headquarters area of the park in a beneficial manner. If the number of private vehicles traveling through the park were reduced as a result of new transportation options, wildlife mortality would likely decrease and the fragmentation effect of high traffic volumes would be reduced.

The short- and long-term, negligible, adverse effects that would result from implementation of Alternative B would contribute to the adverse effects associated with these other projects and overall would result in short- and long-term, negligible to minor, cumulative adverse effects.

Conclusion

Short-term, negligible, adverse effects to wildlife would result from noise and disturbance during construction-related activities. The development of the central HVAC building would result in a long-term, adverse effect due to the removal of wildlife habitat in that area, but this effect would be negligible because of the small size of the building.

Alternative B would not produce major adverse impacts on wildlife or habitats whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general management plan or other NPS planning documents. Consequently, there would be no impairment of wildlife or habitats as a result of the implementation of Alternative B.

CULTURAL RESOURCES

AFFECTED ENVIRONMENT

Cultural resources of concern for this project include archeological sites, historic districts, structures and cultural landscapes, collections, and Native American concerns. The National Historic Preservation Act and its implementing regulations provide guidance for deciding whether cultural resources are of sufficient importance to be determined eligible for listing in the National Register of Historic Places (National Register).

Historic properties include only cultural resources that are listed in, or eligible for listing in, the National Register of Historic Places. However, for purposes of this environmental assessment and assessment of effect, potentially eligible and unevaluated resources (that is, cultural resources that have not been evaluated for National Register eligibility) would be afforded the same level of protection as listed or eligible historic properties.

Cultural Resources Surveys

The Area of Potential Effect (APE) for this project has been inventoried and evaluated under National Register of Historic Places criteria. Archeological surveys include Smith (1987) and Ives et al. (1999). Only one archeological site, a prehistoric kiln, was found in the vicinity of the project APE (5MV3945). The area's historic resources have been inventoried (NPS 1974 and 1996).

A Cultural Landscapes Inventory (a Level II inventory) currently being completed by Shapins Associates (2001) for the National Park Service identifies several cultural landscapes at Mesa Verde National Park. One of these historic landscapes is the Administrative Area, within which are three historic buildings (Building # 13, museum; Building # 14, Chief Ranger's office; and Building # 15, Administrative Building, referred to also as "park headquarters" in this environmental assessment) that would be affected by this project. The area and buildings encompassed by the cultural landscape are also contiguous with the Mesa Verde Administrative District (a National Historic Landmark District). These historic resources have been documented as part of the cultural landscape inventory and in the National Register nomination.

Archeological Resources

Mesa Verde National Park is world-renowned for its archeological sites. These resources led Congress to establish the park in 1906 with the stated purpose to

"provide specifically for the preservation from injury or spoliation of the ruins and other works and relics of prehistoric or primitive man within said park."

These same resources were the basis for listing Mesa Verde National Park on the National Register of Historic Places in 1966. The worldwide value of Mesa Verde's archeological resources was further recognized in 1978, when the park was selected as one of the seven original United Nations world cultural heritage sites.

The archeological remains at Mesa Verde reflect thousands of years of history. However, the primary focus of the park is the period that began about A.D. 550, when a group of Ancestral Puebloans called the Basketmakers settled the Mesa Verde area. By about A.D. 1000, they had become skilled at stone masonry and built structures with thick, double-coursed stone walls, two or three stories high, that were joined together in units of 50 rooms or more (NPS 1996).

Between A.D. 1190 and A.D. 1270, the Ancestral Puebloans moved into cliff alcoves in the canyon walls. There, they built the cliff dwellings for which the park is famous. These structures range in size from one-room houses to the 200-room Cliff Palace. Then in the late 1200's, within the span of one or two generations, the Ancestral Puebloans left their homes and moved away from the area (NPS 1996).

While the cliff dwellings are most famous, they represent only the last 100 years or so of the 700 years of habitation of the Mesa Verde area by the Ancestral Puebloans. The park contains thousands of other archeological sites, although none are as well preserved as the cliff dwellings, which are sheltered from the elements by the cliff alcoves. Hundreds of previously unknown archeological sites were cataloged within the past 10 years in the aftermath of major fires within the park. Most of the park's archeological sites are unexcavated, and are fairly well protected from further deterioration by the dry climate and the layer of soil that has accumulated over them.

Spruce Tree House, one of the park's most well-known and often-visited cliff dwellings, is located in Spruce Tree Canyon a short distance east of the proposed project area. A prehistoric archeological site (5MV3945) is in the general project vicinity. Two sites (5MV3970 and 5MV3987) were located during the 1995 waterline replacement project, and were excavated at that time.

Because the entire park is an archeological district listed in the National Register of Historic Places, all sites within the project area are considered as listed and must be managed accordingly.

Historic Districts and Structures, and Cultural Landscapes

Presently 15 buildings comprise the Mesa Verde Administrative District, which is both a National Register district and a National Historic Landmark.

Three of the buildings in the Administrative district would be affected by the project, including the present museum (1926), the Chief Ranger's office (1927), and the Administration Building (1922). Of all the historic buildings at Mesa Verde, the museum build-

ing is one of the best examples of the pueblo architectural style, with adze-finished wood work, decorative beams, cut-out door and window panels in Indian motif, massive fir log vigas, and pole vigas. Built as a four-room structure between 1923 and 1926 to replace an earlier log museum, it was significantly enlarged in 1935 using Public Works Administration (PWA) funding.

The Chief Ranger's office / natural history museum was designed by Mesa Verde Superintendent Jesse Nusbaum in 1927 as an integral part of the headquarters area. Originally used as a community house, it was remodeled in the early 1930's for use as a natural history museum. The front portion of the structure was built on the foundations of the old log cabin museum (which had been moved elsewhere). The rear of the building extends down the slope to form the rear porch and basement. The building retains much of its original character.

The Administrative Building (1923) began as a small structure north of the superintendent's residence. Additional rooms were added five years later; in 1939-1940 the building was further expanded to accommodate offices and employee facilities. Many elements of the original building, such as corner fireplaces, vigas, log lintels, and adze-crafted timbers, remain, and the structure forms a congruent part of the historic district.

By the 1930's the Chapin Mesa facilities had become overcrowded and inadequate to serve the ever-increasing numbers of visitors. A master plan and six-year development project included water development, landscape work, relocation of roads and trails, and the utility area. New Deal programs funded a number of projects, including the Civilian Conservation Corps (CCC). The CCC remodeled buildings, completed extensive landscaping and trail projects, and built roads and parking. They converted some of the park's dirt and gravel roads to new walkways paved with a bituminous surface, and sidewalks were expanded to serve the new or remodeled buildings. The projects the CCC completed show the quality and workmanship of the era, and contribute significantly to the landscape of the park.

Expansion of the facilities on Chapin Mesa was considered during the 1950's, but was not completed because new facilities could be built only at the risk of sacrificing some of the park's archeological resources (Shapins Associates 2001). During the National Park Service's Mission 66 program, the existing developments, including the museum, were improved and rehabilitated.

Cultural Landscapes. Historic cultural landscapes represent a complex subset of cultural resources. A cultural landscape is a reflection of human adaptation to the landscape and reflects cultural values. Historic cultural landscapes may be expressed in a variety of ways, such as patterns of settlement or land use, systems of circulation and transportation, buildings and structures, parks and open space, etc. A cultural landscape by definition occupies a geographic area that incorporates natural and cultural elements that are associated with a historic activity, event, or person. The National Park Service recognizes four categories:

- Historic designed landscapes (i.e., incorporates a deliberate human element by persons(s) affiliated with the local history which modifies and uses a particular piece of land). This is the type of landscape described in this document.
- Historic vernacular landscapes (reflects on values and attitudes about land over time that are usually influenced by the laymen, e.g., someone's backyard or farm),
- Historic sites (sites significant for their association with important events, activities, and people), and
- Ethnographic landscapes (landscapes associated with contemporary groups that use the land in a traditional manner).

The Mesa Verde headquarters area is one of the park's several cultural landscapes. Character-defining circulation patterns of this landscape include the headquarters loop road, the Spruce Tree House access trail, and the trail system connecting the headquarters area with other areas. Also contributing to the historic cultural landscape are the cluster arrangements of the administrative structures; the trees, shrubs, and mature transplanted vegetation; and the views and vistas across from the west rim of Spruce Tree Canyon to the Spruce Tree House site (Shapins Associates 2001).

Historic Archeological Sites. Archeological remains of former structures and landscape elements may be present beneath the ground surface. However, three-quarters of a century of extensive landscape renovation and building construction make the presence of intact, unaltered historic archeological remains unlikely.

Collections

The National Park Service is a custodian in perpetuity of irreplaceable and priceless museum collections. The park's extensive collections include nearly three million objects that provide invaluable insight into the past processes, events, and interactions among the various cultures, individuals, and the environment. Most of the artifacts came from previous excavation of sites throughout the park; but also included in the collections are ethnographic and historical objects and biological, geological, and paleontological specimens from across the Southwest. The collections include irreplaceable archival materials such as photographs, maps, field notes, publications, records, and other baseline data, which serve as significant scientific and historical documentation of the park's resources and purpose. Selected specimens drawn from this huge collection are housed in the museum to provide for visitor education and enjoyment.

Native American Concerns

No traditional cultural properties have been identified within the project area. However, the park and its resources are deeply valued by many different tribes. Artifacts and archival materials in the museum also form part of the cultural history of tribes affiliated with Mesa Verde National Park (see listing of tribes in the “Consultation and Coordination” section).

IMPACTS OF ALTERNATIVE A - NO ACTION ALTERNATIVE

Analysis

This alternative would not involve any construction activities, although there is a slight possibility that oil spills or leakage could contaminate unidentified archeological resources in the general vicinity of the tanks. Therefore, continuation of existing conditions is expected to have a negligible adverse effect on archeological resources that are either listed in or could be eligible for listing in the National Register of Historic Places.

HISTORIC DISTRICTS AND STRUCTURES, AND CULTURAL LANDSCAPES

This alternative would not involve any construction activities, so there would be a negligible, adverse effect on the districts, structures, and landscapes that are either listed in or could be eligible for listing in the National Register of Historic Places. However, the continued use of aging heating and cooling systems could contribute to a damaging fire and smoke damage, or potential loss of historic buildings that are an integral part of a landmark district and cultural landscape, short- and long-term, moderate adverse impacts.

There would be no new impacts on historic archeological sites.

COLLECTIONS

Fluctuating temperatures and humidity within the museum building would continue to contribute to the deterioration of collections, photographs, and archival materials on display or housed in the building. Long-term, adverse impacts on non-renewable artifacts and archival materials would be moderate.

Should the aged heating system cause a fire, priceless museum objects could be badly damaged or lost, which would have a long-term major adverse effect. Although the threat is, at present, only modest, fire danger would tend to increase in future years if the system is not replaced.

NATIVE AMERICAN CONCERNS

This alternative would not involve any construction activities. Therefore, it would have a negligible effect on sites that are valued by tribes. Deterioration of collections valued by American Indians or loss of items associated with the Native American Grave Protection and Repatriation Act or other significant aspect of the collection would be a long-term, moderate, adverse impact.

Cumulative Effects

Lacking today's more sophisticated archeological methodology, early-day development within the park contributed to a cumulative loss of some archeological materials. Other past and currently proposed projects such as utility and waterline upgrades and rehabilitation of the Far View lodging also have affected or have the potential to affect resources. Fires in 2000 and 2002 caused the loss of some historic structures, while revealing new prehistoric archeological sites.

Throughout the park and on other federal lands in the region, sites would continue to be protected and artifacts would continue to be preserved in accordance with federal and state requirements. However, despite this protection, moderate, adverse effects on cultural resources will continue to occur regionally. These include the deliberate disturbance of archeological sites and removal of artifacts during pot-hunting, and the loss of both archeological and historical sites to urban and residential development, agriculture, fire, deterioration, and erosion. The contribution of Alternative A (based on inadequate preservation of museum artifacts) to these regional effects would be negligible because the potential losses would be very limited when viewed in a broader regional context.

Conclusion

Because no construction is indicated under Alternative A, adverse effects of Alternative A on archeological, ethnographic, historical, and landscape resources would be negligible, except where aging systems may pose a fire danger, which would be a short-term, moderate, adverse impact. Long-term, adverse impacts of inadequate interior climatic conditions on collections and on artifacts/exhibits in the museum and valued by tribes would be moderate in intensity. No effect on tribal relations would be anticipated. The contribution of Alternative A to regional cumulative effects would be negligible.

Alternative A would not produce major adverse impacts on cultural resources whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general manage-

ment plan or other NPS planning documents. Consequently, there would be no impairment of cultural resources as a result of the implementation of Alternative A.

IMPACTS OF ALTERNATIVE B - PREFERRED ALTERNATIVE

Analysis

Intensive cultural resource surveys were conducted in the past in the project area of potential effect, and archeological evidence of past use by Native Americans in the project vicinity has been documented as a single site (5MV3945, a prehistoric kiln).

Implementation of this project would involve a small amount of ground disturbance. The old fuel storage tanks and associated lines would be carefully removed from their location, but because this is a previously disturbed context no *in situ* archeological remains would be expected. The potential for discovering previously unknown archeological sites in association with the construction of Alternative B would be relatively low for the following reasons.

- The area has been surveyed for cultural sites;
- The area of ground disturbance is very small (a trench 25 to 30 feet in length), and most of the buried utilities would be placed in existing, disturbed utility corridors;
- Removal of the existing LPG gas tank and replacement with a new tank would occur in a previously disturbed area, and the tank would be screened from public view;
- The area has been altered in the past by grading, installation of utilities, and construction of buildings, sidewalks, and roadways; and
- This area has received visitor use for many years. Any near-surface archeological resources situated adjacent to walkways that were readily recognizable (stone tools or pot sherds) probably have been removed as souvenirs.

There would be no new impacts on historic or prehistoric archeological sites.

HISTORIC DISTRICTS AND STRUCTURES, AND CULTURAL LANDSCAPES

Installation of new heating, cooling, and humidity control systems in the museum, Chief Ranger's office, and the headquarters building would involve introduction of non-historic elements into historic structures that are part of a National Historic Landmark District. There would be moderate, short-term, adverse visual and audible (and perhaps atmospheric) effects on the National Register of Historic Places-character defining features (e.g., feeling, association, setting, design) of both the cultural landscape and the Mesa Verde Administrative District. However, these effects would be local in scale and temporally limited.

The HVAC installation would be done in a manner that would not remove substantive amounts of original fabric, and changes in exterior and interior façades would not be visible. Grill and vents would be chosen to blend with the interior architecture. Any removed fabric would be replaced in kind, and new elements of the heating/cooling systems would be hidden in existing wall or crawl spaces. The scale, design, and materials of the new climate control door at the entrance to the museum would be carefully chosen by the park's historical architect to blend with the existing historic exterior façade. Non-historic elements, such as air conditioners and potentially hazardous equipment, also would be removed from within and near to the historic structures, a long-term, minor, beneficial effect. Installation of new HVAC systems also would aid in the indirect, long-term preservation of the buildings by stabilizing interior humidity and temperature. With mitigating measures as described above, implementation of this alternative would have both long-term adverse and beneficial impacts of minor intensity on the historic buildings.

The design of the central HVAC utility building is intended to leave the overall feeling and association of the Administrative District relatively unchanged by avoiding a major intrusion on the landscape. While obviously a new structure, it would be small in scale, of the same materials (stone, wood window frames, etc.) and general conceptual design as the adjacent historic structures, and would be well hidden from visitor view behind the library. Strategically placed shrubbery would provide additional viewshed protection, so installation of the building and the new propane tanks would have no adverse effect on the cultural landscape or historic landmark district.

COLLECTIONS

Protective measures as described in Table 2: Mitigation Measures and Best Management Practices would be implemented prior to beginning work on the museum, so that any possible adverse, short-term impacts on collections during construction would be negligible. Installation of new humidity controls along with new heating and cooling systems would help to preserve the collections, exhibits, and archival materials by introducing appropriate interior climate controls and reducing temperature and moisture fluctuations. Under Alternative B, deterioration would be slowed and preservation aided so that long-term impacts on collections would be moderate and beneficial.

NATIVE AMERICAN CONCERNS

No ethnographic sites have been identified in the area of potential effect, and because the amount of new ground disturbance is very low, only negligible, adverse impacts on sites or artifacts valued by tribes would be expected. By improving the HVAC systems in the museum, exhibits, artifacts, and archival materials important to the affiliated tribes would be better preserved, a minor to moderate beneficial effect. Construction could cause minor inconvenience to American Indians visiting the park (e.g., a short-term, minor, adverse impact).

Cumulative Effects

Lacking today's more sophisticated archeological methodology, early-day development within the park may have contributed to a cumulative loss of some archeological materials. Other past and currently proposed projects such as utility and waterline upgrades and rehabilitation of the Far View lodging also have affected or have the potential to affect resources. Fires in 2000 and 2002 caused the loss of some historic structures, while revealing new prehistoric archeological sites.

Throughout the park and on other federal lands in the region, sites would continue to be protected and artifacts would continue to be preserved in accordance with federal and state requirements. However, despite this protection, moderate, adverse effects on cultural resources will continue to occur regionally. These include the deliberate disturbance of archeological sites and removal of artifacts during pot-hunting, and the loss of both archeological and historical sites to urban and residential development, agriculture, fire, deterioration, and erosion. However, the contribution of Alternative B to these regional effects would be negligible because of the limited scope of this project within the broader context.

Conclusion

With mitigation, implementation of the preferred alternative would result in local, long-term, negligible to minor, adverse impacts on archeological resources. With mitigating measures as described above, implementation of this alternative would have both long-term adverse and beneficial impacts of minor intensity on the historic buildings.

With mitigating measures, installation of new HVAC equipment would have a short-term, minor adverse impact on historic structures (introduction of non-historic elements into a NHL District would be done in a non-intrusive way). Replacement of inadequate and unsafe systems would have long-term, minor, beneficial effects on the buildings.

Introduction of a non-historic structure into this historic landscape setting would be partially mitigated by the building location, design, and materials and by vegetative screening, resulting in minor, long-term, adverse impacts to the integrity of the historic district and its landscape.

Short-term adverse impacts on collections during construction would be negligible; installation of new systems would provide long-term, moderate, beneficial impacts.

Alternative B would not produce major adverse impacts on cultural resources whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general manage-

ment plan or other NPS planning documents. Consequently, there would be no impairment of cultural resources as a result of the implementation of Alternative B.

SECTION 106 SUMMARY

Archeological and historical resources in the area of potential effect have been inventoried and evaluated under National Register criteria (see the “Affected Environment” section of this document). No traditional cultural properties have been identified within the project area, but consultation with concerned tribes is continuing to ensure tribal concerns are reflected during planning and project implementation (see “Consultation and Coordination” section of this document).

Section 106 compliance for this project has been completed (see attached correspondence between the National Park Service and the Colorado State Historic Preservation Officer, Appendix A). Table 9 summarizes the National Register status of cultural resources in the area of potential effect. A copy of this environmental assessment will be forwarded to the Colorado State Historic Preservation Office (SHPO) to further document the proposed project actions and mitigation.

This environmental assessment provides detailed descriptions of two alternatives (including a No Action Alternative), analyzes the potential impacts associated with possible implementation of each alternative, and describes the rationale for choosing the preferred alternative. Also contained in the environmental assessment are mitigation measures that would help avoid adverse effects on cultural resources (see Table 2).

For example, potential ground-disturbing activities such as subsurface utility installation would be placed in previously disturbed utility corridors wherever possible, and would be carefully planned in areas containing cultural sites. Prior to construction activities, archeological sites would be flagged for avoidance. Tight construction limits would be established so that sites were avoided. Work crews would be instructed about the sensitivity and importance of cultural sites.

An archeologist meeting the Secretary of the Interior’s Standards would monitor ground-disturbing activities. To reduce unauthorized collecting from areas, construction personnel would be educated about cultural resources in general and the need to protect any cultural resources encountered. Work crews would be instructed regarding the illegality of collecting artifacts on federal lands to avoid any potential Archeological Resources Preservatives Act violations. This would include instructions for notifying

TABLE 9: CULTURAL RESOURCES SECTION 106 EFFECT MATRIX

Resource Topic	Site Number/Name	Effect	Mitigation Measure	Further 106 Action	Remarks
Prehistoric Archeological Resources	5MV3945	<i>No resources affected</i>	Define work limits and avoid 5MV3945 during construction. Stop work and protect site(s) if resources encountered.	None	Section 106 has been completed for this project. This EA will be sent to SHPO for review and comment.
Historic Archeological Sites	None known in area	<i>No resources affected</i>	Stop work and protect site(s) if resources encountered.	Same as above	Same as above
Historic Structures, Interiors, and Exteriors	Four historic structures within the Mesa Verde Administrative District (NHL District)	<i>No adverse effect from construction of new HVAC; beneficial effect (no adverse effect) of new system</i>	Design new HVAC building (low profile, stone façade, wood windows), grills and vents to be compatible with historic district but distinguishable from historic buildings.	Same as above	Same as above
Historic Cultural Landscapes	Contiguous with NHL District	<i>No adverse effect of new construction</i>	Same as above, plus use vegetation to screen new building.	Same as above	Same as above
Collections and Archival Materials	Housed in museum	Benefited by new HVAC system (<i>no adverse effect</i>)	Establish and enforce protective measures before and during construction at museum.	Same as above	Same as above
Native American concerns	No known ethnographic sites in area; artifacts housed in museum	<i>No resources affected (sites); Collections benefited by new HVAC system (no adverse effect)</i>	Afford any discovered sites protection (see mitigating measures). Continue consultation, including notification of project inception.	Same as above	Same as above

appropriate personnel if human remains were discovered. In the event that cultural resources were discovered during construction, work would be halted in the vicinity of the resource, and procedures outlined in 36 *Code of Federal Regulations* 800 would be followed. These measures also would help to protect ethnographic materials.

Mesa Verde National Park staff would continue to educate visitors regarding archeological site etiquette to provide long-term protection for surface artifacts and architec-

tural features. Surveys have identified only one archeological site, MV3945, in the project vicinity, and this site would not be impacted by the project. There would be *no adverse effects* on archeological sites.

Some non-historic elements and potentially hazardous older equipment would be removed from historic buildings, and new non-historic elements such as grills, vents, and other HVAC outlets/inlets would be carefully chosen to blend with historic interiors. Wherever possible, the new HVAC system would be installed in walls and crawl spaces. Removed structural fabric would be replaced in kind. Installation of new HVAC systems would aid in long-term preservation of the historic buildings by stabilizing interior humidity and temperature. In any situation where interior architectural integrity may be threatened, a professional historical specialist would be consulted before proceeding.

The new low-profile HVAC building would be carefully designed to blend unobtrusively into the existing historic structures within the Mesa Verde Administrative [National Historic Landmark] District while remaining distinguishable from the historic buildings. A stone façade and wood window frames would be used to help ensure compatibility with the surrounding masonry buildings, and vegetative screening would be used to help hide the new building, which would be located behind and partially shielded by the library building. These measures would help to minimize changes in the historic setting so that the feeling and association of the Administrative District would remain unchanged, resulting in a *no adverse effects* determination.

To ensure that collections, artifacts, and exhibits are protected from vibration, dust, light, and breakage, appropriate mitigation measures would be taken before and during construction in and near the museum. Over time, installation of new interior climate controls would be beneficial to the park's collections. Collections would benefit from this project, resulting in a *no adverse effect* determination.

There would be *no adverse effect* on resources valued by tribes, or on tribal concerns. Tribes have been contacted regarding this project, and the park will continue to work with tribes to protect valued resources.

Pursuant to 36 *Code of Federal Regulations* Part 800.5, implementing regulations of the National Historic Preservation Act (revised regulations effective January 2001), addressing the criteria of effect and adverse effect, the National Park Service finds that the implementation of the project in Mesa Verde National Park, with identified mitigation measures, would not result in adverse effects on archeological, historic, ethnographic, cultural landscape, or museum collection resources currently identified as eligible for or listed in the National Register of Historic Places.

PARK OPERATIONS

AFFECTED ENVIRONMENT

The superintendent of Mesa Verde National Park is responsible for managing the park, its staff and residents, all of its programs, and its interactions with persons, agencies, and organizations interested in the park. Park staff provide the full scope of functions and activities to accomplish management objectives and meet requirements of law enforcement, emergency services, public health and safety, science, resource protection and management, visitor services, interpretation and education, community services, utilities, housing, fee collection, and management support.

Ongoing maintenance operations are necessary to sustain the current heating and cooling system in the museum, headquarters, and Chief Ranger's office. The four 500-gallon underground storage tanks (two next to the museum; one next to the headquarters building; and one next to the Chief Ranger's office) supply fuel to the boilers for heat in each of the buildings. These tanks need to be refilled once a month with special precautions taken to prevent spills. The heating system requires approximately two to three days of service per month by two to three park employees. Each year the heating pumps also need to be cleaned and the entire system flushed, which requires a full week of work for all three buildings. In addition, the boilers need to be monitored on a daily basis to reduce the potential for fire in the historic structures (Cope pers. comm. 2003a).

There is presently no cooling system in the museum. Park headquarters and the Chief Ranger's office each have one air-cooling unit to service the building. Maintenance requirements for the cooling system include draining the water and changing the pads in the units to winterize each fall. This takes about a half a day for each building for one park employee (Cope pers. comm. 2003a).

IMPACTS OF ALTERNATIVE A - NO ACTION ALTERNATIVE

Analysis

Under Alternative A, current maintenance operations on the heating and cooling system would continue into the future. The four boilers that provide heat to the museum, headquarters, and Chief Ranger's office were installed in the 1970's, and the necessary repair and daily monitoring associated with upkeep would continue to have a long-term, minor, adverse effect on park operations. Maintenance of the cooling units would also have long-term, minor, adverse effects on park operations because the units are old and require frequent repair.

Cumulative Effects

The long-term, minor, adverse impacts that would result from implementation of the No Action Alternative would not have a large cumulative impact on park operations when compared to other projects within the park. The improvement projects that are planned for the park, including the housing plan, Far View lodging rehabilitation, and construction of a cultural center, would have both beneficial and adverse effects. Beneficial effects of these projects would be minor to moderate as the park staff's ability to provide quality services improved, while adverse effects would only be minor from increased demands on National Park Service staff. Therefore, this alternative, in conjunction with these other projects, would result in long-term, minor, cumulative adverse effects.

Conclusion

Alternative A, the continued use of the existing heating and cooling system for the museum, headquarters, and Chief Ranger's office, would continue to have a long-term, minor, adverse effect on park operations by increasing maintenance costs and labor in maintaining an old, inefficient heating and cooling system.

IMPACTS OF ALTERNATIVE B - PREFERRED ALTERNATIVE

Analysis

Alternative B would have a long-term, moderate, beneficial effect on park operations by providing an efficient, reliable, state-of-the-art heating and air conditioning system. This new system would substantially reduce the maintenance obligation presently associated with the frequent repair of the existing 30-year-old heating and cooling system and the repair and winterization of the cooling units. Maintenance on the new system would be reduced because most of the maintenance and monitoring for the heating and cooling system would be centralized in one new utility building. The new system would still require monitoring, approximately one day a week, but less seasonal work would be necessary. No new employees would need to be hired to maintain the new system; however, an acclimation period would be anticipated during the transition.

Although the park would have to monitor the contractor during the construction of the HVAC building/system, this would have a short-term, negligible effect on park operations.

Propylene glycol would be used as the heat transfer fluid in the HVAC system. This fluid is not classified as hazardous or considered hazardous under ordinary conditions and use. Because it requires only ordinary precautions, its use would have a long-term, negligible effect on park operations (MSDS 2001).

Cumulative Effects

The long-term, moderate, beneficial effects that would result from installation of a HVAC system would lead to a moderate, beneficial, cumulative effect when combined with other park projects. This would be a result of other projects in the park, mostly planned improvement projects that would improve National Park Service staff's ability to provide quality services and emergency response to visitors. These other projects, also would be expected to have long-term, minor to moderate, beneficial effects on park operations.

Conclusion

Alternative B would have a long-term, moderate, beneficial effect on park operations by providing an efficient, reliable, state-of-the-art heating and cooling system. The maintenance burden with the new system would be significantly less when compared to maintaining the existing 30-year-old heating and cooling system.

PUBLIC HEALTH AND SAFETY

AFFECTED ENVIRONMENT

Visitors and park staff would be the two primary groups potentially affected by the proposed action. The museum is a destination site for approximately 350,000 visitors entering the park annually. The park headquarters, Chief Ranger's office, library, senior staff housing, and Post Office are also located in the project area. The level of human activity from both visitors and park staff in this developed area requires public health and safety issue consideration.

The museum, headquarters, and Chief Ranger's office lack adequate air conditioning, and the summertime temperatures frequently exceed 90 degrees. The current heat source is through boilers, located in each of the buildings, and these can be considered an ignition source for fire. Also, the four 500-gallon fuel underground storage tanks contain a flammable substance, so precautions must be taken when refilling to reduce the fire hazard.

IMPACTS OF ALTERNATIVE A - NO ACTION ALTERNATIVE

Analysis

Under Alternative A, the lack of air conditioning in the museum, headquarters building, and Chief Ranger's office during the peak summer season would continue to represent a long-term, minor, adverse health risk to visitors and park staff. Approximately 350,000 visitors per year and park staff would continue to be subjected to very high temperatures (90 degrees plus) during the summer season, where adverse effects could range from discomfort to more serious health problems related to heat exposure.

The existing heating boilers (potential ignition sources) in each of the three structures and the underground fuel storage tanks located directly adjacent to these structures would continue to pose a long-term, minor, adverse safety risk due to increased fire potential, the unpleasant heating fuel odors in the basement, and a continuation of current code violations.

Cumulative Effects

Alternative A would not contribute to any cumulative effects when analyzed in conjunction with any other past, present, or reasonably foreseeable future actions.

Conclusion

The No Action Alternative would continue to have a long-term, minor, adverse effect on public health and safety as a result of heat-related health risks to visitors and park staff and increased fire potential.

IMPACTS OF ALTERNATIVE B - PREFERRED ALTERNATIVE

Analysis

If Alternative B were implemented, the new HVAC system would provide an efficient and effective heating/cooling system for the museum, headquarters, and Chief Ranger's office. The HVAC system would have a long-term, minor, beneficial effect for museum visitors by eliminating the discomfort and potential health problems presently associated with temperature extremes within the museum. The same beneficial effects would accrue to park staff and others who work and conduct business in the headquarters and Chief Ranger's office.

Propylene glycol would be used as the heat transfer fluid in the HVAC system. This fluid is not classified as hazardous or considered hazardous under ordinary conditions and use. The Material Safety Data Sheet (MSDS) for propylene glycol, which contains chemical and health and safety information about the substance, would need to be available to park staff working in the area. Because this substance requires only simple precautions, its use would have a long-term, negligible adverse effect on public health and safety (MSDS 2001).

The removal of existing heating boilers and fuel supply tanks in and adjacent to each of the three buildings would have a long-term, minor, beneficial effect on public health and safety, reducing the risk of fire by eliminating ignition points and flammable fuels. Although the potential for fire would still exist with the boilers for the new system, they would be located within a concrete-walled central utility building so that fire would be contained. The fuel odors that currently exist in the basement would no longer be a problem, and removing the boilers would eliminate code violations.

The addition of two 1,000-gallon propane tanks would be required for the new HVAC system. These new tanks would be placed adjacent to the existing 1,000-gallon tank. Although the tank would be located behind the public restrooms and library, the additional propane usage would have a negligible effect on health and safety. The location of the tanks would be in compliance with Colorado state standards (greater than 10 feet from residential or public buildings).

There would also be potential short-term public health and safety risks during construction activities related to the development of the HVAC building and installation of utility lines. To minimize the potential for construction-related accidents, Alternative B

would include mitigation measures, such as those that are included in Table 2. Mitigation Measures and Best Management Practices. As a result of implementing mitigation measures, construction activities would have a short-term, negligible to minor, adverse effect on public health and safety.

Cumulative Effects

With the exception of the short-term, negligible to minor, adverse effect during construction activities, effects to public health and safety as a result of implementation of Alternative B would be minor and beneficial. These short-term, adverse effects would also result from other construction activities that are planned within the park, and the effects could be amplified if several projects occurred simultaneously. Proper planning and the use of mitigation measures would lead to short-term, negligible to minor, adverse, cumulative effects on public health and safety.

Installation of a new HVAC system would result in minor beneficial effects on public health and safety by reducing the risk of fire from deficient boilers and underground fuel tanks. The National Park Service is also in the process of preparing a new fire management plan that would contribute to the protection and enhancement of public health and safety of visitors and employees within the park. The fire management plan, which would develop management techniques to control the magnitude of wildfires, would also provide long-term, beneficial effects. Implementation of a new fire management plan, in combination with the minor beneficial effect of Alternative B from eliminating ignition sources of fire with replacement of the current HVAC system, would cumulatively reduce the risk to public health and safety from fire. The overall benefit would be minor and long-term.

Conclusion

Alternative B would result in long-term, minor, beneficial effects on public health and safety through elimination of heat-related discomfort and potential health problems by installing an adequate and reliable HVAC system and reducing the risk of fire through removal of the boilers and underground fuel storage tanks (possible ignition sources). Construction-related activities could lead to short-term, negligible to minor, adverse effects on public health and safety because of the potential for accidents; however, best management practices would be implemented to minimize these risks.

VISITOR USE AND EXPERIENCE

AFFECTED ENVIRONMENT

The park is open year round, with visitation from 1997-2002 averaging 600,000 annually. The heaviest visitation occurs in summer months. The archeological sites found in Mesa Verde are some of the most notable and best preserved in the United States, dating from 600 A.D. to 1300 A.D. The park offers visitors a spectacular look into the lives of the ancestral Pueblo people. Access to Morefield campground, Wetherill Mesa, the Far View visitor center, and the Far View lodging complex are located within 15 miles of the park entrance and provide the first activity areas for park visitors. The majority of visitors continue on to Chapin Mesa (prehistoric sites loop tour) to visit the park museum, Spruce Tree House cliff dwelling, amphitheater, concession, and picnic area to complete their park experience. The majority of winter and summer visitation focuses on Chapin Mesa. The project area (which includes the library, museum/bookshop, park headquarters, and Chief Ranger's office) is located on the southern end of Chapin Mesa. Approximately 350,000 tourists visit the park museum each year. Presently, the lack of an air conditioning system in the park museum creates discomfort for visitors during the summer season.

IMPACTS OF ALTERNATIVE A - NO ACTION ALTERNATIVE

Analysis

The lack of air conditioning in the museum during the peak summer season would continue to represent a short- and long-term, minor to moderate, adverse effect on the quality of the visitor experience. Approximately 350,000 museum visitors, per year would continue to be subjected to 90+ degree temperatures during the summer season, with the potential adverse effect of reducing the length of stay in this interpretive/educational facility. This would have the indirect adverse effect of reducing the visitors' understanding and appreciation of the park's significance and the cultural value of museum artifacts associated with this world-class protected area.

The fumes from the two existing underground fuel storage tanks for the museum heating system have a short- and long-term, minor, adverse effect on visitors. These fuel tanks, located adjacent to the museum, create unpleasant odors for visitors entering and exiting the museum. The fumes escape from the tank venting pipes and from occasional fuel spills. Filling the tanks also has a reoccurring, short-term, negligible to minor, adverse effect by disrupting visitor flow into and out of the museum.

Cumulative Effects

There are no other projects planned in the Chapin Mesa area that would contribute cumulatively to other short- and long-term, minor to moderate, adverse effects of the No Action Alternative.

Conclusion

The lack of air conditioning in the museum during the peak summer season would continue to represent a short- and long-term, minor to moderate, adverse effect on the quality of the visitor experience. Approximately 350,000 museum visitors, per year would continue to be subjected to 90+ degree temperatures during the summer season, with the potential direct adverse effect of reducing the length of stay in this interpretive/educational facility.

The fumes from the two underground fuel storage tanks for the museum heating system have a short- and long-term, minor, adverse effect on visitors. These fuel tanks, located adjacent to the museum, create unpleasant odors for visitors entering and exiting the museum.

IMPACTS OF ALTERNATIVE B - PREFERRED ALTERNATIVE

Analysis

Many of the park's utility lines in the project area are buried beneath the existing asphalt sidewalks. The new HVAC lines would share the same underground trench now being utilized by the existing utility system. This action would have a short-term, minor to moderate, adverse effect on the visitor experience because approximately 280 feet of the existing asphalt sidewalk system, located in front of and on both approaches to the museum/bookstore, would be temporarily removed to allow for installation of the new HVAC system. Also, a 12-foot by 20-foot section of the roadway crosswalk in front of the museum would be temporarily removed for the HVAC installation.

The existing buried fuel tanks that supply the museum's current heating system are located adjacent to the museum. Fumes from tank venting pipes and from refilling operations are readily noticeable to visitors entering and exiting the museum. The installation of the new HVAC system would have a short-term, minor, adverse effect on visitors because of the disruptive activities associated with the removal of the existing buried fuel tanks and the temporary removal of the sidewalk/crosswalk directly adjacent to the museum.

In the long-term, the new HVAC system would have a moderate, beneficial effect on the quality of the visitor experience for approximately 350,000 visitors per year because

during high use summer months, museum visitors would have a more comfortable environment in which to enjoy the museum, potentially increasing their length of stay in the museum. This action could have the beneficial effect of increasing the visitors' understanding and appreciation of the park's significance and the cultural value of museum artifacts and exhibits. Also, the removal of fuel tanks located adjacent to the museum would have a long-term, minor beneficial effect by eliminating fumes and odors associated with venting pipes and spillage that presently occurs during refilling operations, and by eliminating the disruption of visitor flow into and out of the museum caused by the refilling operation.

The activity associated with the construction of the central HVAC utility building would have a short-term, negligible to minor, adverse effect because of the proximity of the construction site to the visitor use area. Once completed the central HVAC utility building would have a long-term, negligible effect on the visitor experience because it would be located behind the library and be only partially visible from the visitor use area.

Cumulative Effects

The park is in the process of initiating four planning efforts:

- Cultural center planning and design,
- Far View lodging complex improvements project and environmental assessment,
- Comprehensive interpretation plan, and
- Transportation plan and environmental impact statement.

Alternative B would have a short-term, minor to moderate, adverse effect on visitor use during project implementation due to construction activity. Alternative B would have a long-term, moderate, beneficial effect once the new air-conditioning system is operational by improving the comfort level for museum visitors. Coordinated properly, the combined implementation actions resulting from future planning efforts and Alternative B would have long-term, moderate, beneficial, cumulative effect on visitor use and experience. The new cultural center at the park entrance, the Far View lodging complex upgrades, and implementation of the transportation and comprehensive interpretive plans would have long-term, beneficial effects on the visitor experience because of improved services, access, and educational opportunities. Therefore, these projects, in combination with Alternative B, would lead to a moderate, beneficial, cumulative effect on visitor use and experience. However, in the short-term, the disturbance associated with these other projects in combination with Alternative B would likely be amplified if implementation occurred simultaneously, causing unacceptable increases in traffic volume, noise, and road closures.

Conclusion

Temporary removal of the asphalt sidewalks/crosswalk to install new HVAC underground lines would have a short-term, minor to moderate, adverse effect on the visitor experience because approximately 280 feet of the existing asphalt sidewalk system, located in front of and on both approaches to the museum/bookstore, would be temporarily removed to allow for installation of the new HVAC system.

The installation of the new HVAC system would have a short-term, minor, adverse effect on visitors because of the disruptive activities associated with the removal of the existing buried fuel tanks located adjacent to the museum.

In the long-term, the new HVAC system would have a moderate, beneficial effect on the quality of the visitor experience for approximately 350,000 visitors per year because during high use summer months, museum visitors would have a more comfortable environment in which to enjoy the museum, potentially increasing their length of stay in the museum. Also, the removal of fuel tanks located adjacent to the museum would have a long-term, minor, beneficial effect by eliminating fumes and odors associated with venting pipes and spillage that presently occurs during refilling operations, and by eliminating the disruption of visitor flow into and out of the museum caused by the refilling operation.

The activity associated with the construction of the central HVAC utility building would have a short-term, negligible to minor, adverse effect because of the proximity of the construction site to the visitor use area. Once completed the central HVAC utility building would have a long-term, adverse negligible effect on the visitor experience because it would be located behind the library and be only partially visible from the visitor use area.

CONSULTATION AND COORDINATION

Consultation and coordination with interested and affected tribes, public, and other federal agencies were important to the planning process for the installation of a new HVAC system at Mesa Verde National Park. Interested individuals and groups had several opportunities to share their views and concerns during the process.

The scoping and public involvement process is described below. Consultations with the various tribes are more specifically discussed under the section titled Tribal Consultations.

SCOPING PROCESS

Scoping for this plan and environmental assessment formally began in 2001, although it actually started much earlier. In 1994, the park began to look more closely at evaluating problems and issues regarding the HVAC system and at ways to address these issues. Issues and concerns related to the installation of a new HVAC system were identified by National Park Service specialists with input from other federal, state, and local agencies; the 24 tribes affiliated with the park; and the general public. Issues include:

- The current heating and air conditioning systems are inadequate; in the summer, temperatures are extreme.
- The heating system has two associated problems: the old fuel tanks need to be replaced and are prone to overfilling, and the boilers in each of the buildings pose a fire threat to historic structures.
- Potential disturbance of archeological resources during construction of the new structure and utility lines.
- Impacts on the National Historic Landmark District structures from construction activities.
- Impacts on the cultural landscape by addition of a new building in a landmark district.

- Potential for fire and smoke damage to National Historic Landmark District structures from aging HVAC equipment.
- Deterioration of park collections (including items valued by affiliated tribes) from inadequate interior climate controls at the museum.

Park staff then consulted with various engineering and design firms to determine cost effective and feasible alternatives to properly heat and cool the museum, park headquarters, and Chief Ranger's office. After gaining information regarding the types of HVAC systems available as an option, park management began discussing the proposed alternatives in greater depth with park staff, neighboring communities, other agencies and tribes.

Various formal and informal meetings, presentations, interviews, and phone calls served as an integral part of the planning process. Their purpose was to identify issues, alternatives, and impact topics that would be considered in the plan and to keep the public informed throughout the plan formulation.

During December 2001, the park used the park newsletter, the Cortez Journal, and letters sent to appropriate property owners to request attendance at a public meeting to discuss scoping issues for several park projects, including the HVAC environmental assessment. The public meeting was held in Cortez in January 2002; however, there were no comments from the public relating to the HVAC environmental assessment.

TRIBAL CONSULTATIONS

For the past 10 years the park has held yearly consultation meetings with the 24 tribes and pueblos associated with the park (see Table 10 below). A typical consultation meeting lasts three days and is attended by at least one and up to four representatives of a majority of the tribes. Various presentations are made on park activities, and then questions are asked and answered. On the morning of the third day, the tribal representatives begin a closed executive session that is not attended by any non-tribal people. This allows the representatives to have a more open discussion while protecting culturally sensitive information. One representative is selected to present the results of the executive session to the attending park staff, who are able to ask for clarification. Then the meeting concludes.

The proposal for an improved heating and air conditioning system, as described within this assessment, was discussed at meetings held in 2001 and 2002. There were no issues or concerns raised by the tribes. Copies of this environmental assessment will be sent to each pueblo and tribe for review and comment.

TABLE 10: TRIBES AND PUEBLOS THAT ARE CULTURALLY AFFILIATED OR ASSOCIATED WITH MESA VERDE NATIONAL PARK

Tribe/Pueblo	City	State
Acoma, Pueblo of	Acoma	New Mexico
Cochiti, Pueblo of	Cochiti	New Mexico
Isleta, Pueblo of	Isleta	New Mexico
Jemez, Pueblo of	Jemez	New Mexico
Laguna, Pueblo of	Laguna	New Mexico
Nambe, Pueblo of	Santa Fe	New Mexico
Picuris Pueblo	Penasco	New Mexico
Pojoaque, Pueblo of	Santa Fe	New Mexico
Sandia, Pueblo of	Bernalillo	New Mexico
San Felipe, Pueblo of	San Felipe	New Mexico
San Ildefonso, Pueblo of	Santa Fe	New Mexico
San Juan, Pueblo of	San Juan	New Mexico
Santa Ana Pueblo	Bernalillo	New Mexico
Santa Clara Pueblo	Espanola	New Mexico
Santo Domingo, Pueblo of	Santo Domingo	New Mexico
Taos Pueblo	Taos	New Mexico
Tesuque Pueblo	Santa Fe	New Mexico
Ysleta del Sur Pueblo	El Paso	Texas
Zia, Pueblo of	Zia Pueblo	New Mexico
Zuni, Pueblo of	Zuni	New Mexico
Hopi Tribe	Kykotsmovi	Arizona
Navajo Nation	Window Rock	Arizona
Ute Mountain Ute Tribe	Towaoc	Colorado
Southern Ute Tribe	Ignacio	Colorado

CONSULTATIONS WITH THE COLORADO STATE HISTORIC PRESERVATION OFFICER

Section 106 compliance for this project has been completed (see attached correspondence between the National Park Service and the Colorado State Preservation Officer, Appendix A).

OTHER AGENCIES AND ORGANIZATIONS CONTACTED

Mesa Verde National Park is in the process of informal consultation with the U.S. Fish and Wildlife Service (USFWS). This environmental assessment will be sent to the USFWS for concurrence with the findings presented in the “Endangered, Threatened, or Protected Species, and Critical Habitats” section.

PREPARERS

NATIONAL PARK SERVICE

Larry T. Wiese, Superintendent
Erika Campos, Landscape Architect
Frank Cope, Chief of Maintenance
Donald Corbeil, Historic Architect
Gary Gasaway, Roads and Trails Supervisor
Susan Johnson-Erner, Concessions Specialist
Noel Logan, Archeologist
William Morris, Chief of Interpretation
Charles Peterson, Chief Ranger
Linda Towle, Chief of Research and Resources Manager
Patricia Trap, Chief of Planning
George San Miguel, Natural Resources Manager
Kirby Weaver, Buildings and Utility Supervisor

PARSONS

Timberley Belish, Environmental Scientist
Don Kellett, Principal Scientist
Mark Norman, Environmental Scientist
Diane Rhodes, Cultural Resource Specialist
Nicole White-Scott, Environmental Scientist
Bart Young, Project Manager/Planner

RECIPIENTS

RECIPIENTS OF PAPER COPIES

Copies of this environmental assessment will be sent to the following agencies and organizations.

The tribes and pueblos listed in Table 10
Advisory Council in Historic Preservation
Colorado State Historic Preservation Officer
U.S. Fish and Wildlife Service
Cortez, City of
Dolores, Town of
Durango, City of
Mancos, Town of
Cortez Chamber of Commerce
Dolores River Valley Chamber of Commerce

Durango Area Chamber of Commerce
Mancos Valley Chamber of Commerce
Montezuma County Commissioners
Montezuma County Economic Development Council
ARAMARK Mesa Verde
Friends of Mesa Verde
Mesa Verde Foundation
Mesa Verde Museum Foundation
National Park Foundation
National Parks and Conservation Association
Cortez Public Library
Dolores Public Library
Durango Public Library
Mancos Public Library
Cortez Journal
Durango Herald
Mancos Times Tribune

Individuals who indicated an interest in this action also will receive a copy of this environmental assessment.

AVAILABILITY ON THE INTERNET

This document is available on the internet. From the Mesa Verde National Park home page at <http://www.nps.gov/meve/index.htm>, click on “Current Events and Public Information” under the “News and Events” heading. Follow the links under “2003” that lead to a .pdf version of this document. The document can be viewed online or can be downloaded.

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APPENDIX A
COMPLIANCE/CORRESPONDENCE



United States Department of the Interior

NATIONAL PARK SERVICE
Mesa Verde National Park
Colorado 81330

IN REPLY REFER TO:

H4217(MEVE)

September 1, 2000

Ms. Georgiana Contiguglia
State Historic Preservation Officer
Colorado Historical Society
1300 Broadway
Denver, Colorado 80202

Dear Ms. Contiguglia:

Enclosed you will find an Assessment of Effect form for a proposed project at Mesa Verde National Park. We are planning to upgrade the heating system in the buildings in the Headquarter's Area, and install air conditioning in the Chapin Mesa Archeological Museum.

If you have questions, please contact Noel Logan, our 106 Compliance Archeologist, at 970-529-5076.

Sincerely,

Larry T. Wiese
Superintendent

Enclosure



COLORADO
HISTORICAL
SOCIETY

The Colorado History Museum 1300 Broadway Denver, Colorado 80203-2137

12 September 2000

Larry T. Wiese
Superintendent
Mesa Verde National Park
Colorado 81330

RE: Heating system upgrade, Mesa Verde Administration District (5MT.9790), Montezuma
County

Dear Mr. Wiese:

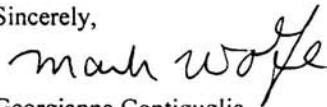
Thank you for your recent correspondence dated 1 September 2000, concerning the proposed upgrade to the heating system in some of the buildings at Mesa Verde National Park. The project includes work on the Museum (Building #13), Chief Ranger's Office (Building #14), Administrative Building (Building #15), and the Library (Building #19). These structures are included in the Mesa Verde Administration District (5MT.9790), which is a National Historic Landmark (NHL) District. Our office has reviewed the submitted plans and materials.

The proposed heating/cooling building will have no adverse effect on the NHL District so long as it is clearly distinguishable as new construction. The stone façade and wood windows should be kept as simple as possible. We concur with your decision to use vegetative screening to help screen the new building from the existing ones.

The work proposed to the existing structures (adding new hot and cold water lines, air handling units, etc.) will have no adverse effect on the NHL District. Because the work involves sub-surface activities, there is the potential for uncovering archaeological remains/artifacts. In case of such an event, please stop work immediately and contact our office for further guidance.

If you have any questions, please feel free to contact Joseph Saldibar, Architectural Services Coordinator, at (303) 866-3741. We look forward to hearing from you.

Sincerely,

for 
Georgianna Contiguglia
State Historic Preservation Officer, and
President, Colorado Historical Society

OFFICE OF ARCHAEOLOGY AND HISTORIC PRESERVATION

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As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

**UNITED STATES
DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE**

**Mesa Verde National Park
Superintendent
P.O. Box 8
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